Wanted—A Paper Market

THE outstanding necessity of the paper industry is a stable paper market. In other words, a continuous, stable outlet for paper produced by the American mills. The paper industry as one of the five leading industries of the United States, has never been sold to the consuming public. Paper is paper to 90 per cent of the paper consumers.

Flour used to be flour until Gold Medal and Pillsbury's came out and standardized, with the result that now the majority of the bread-eaters of America use standard brands of flour. The same is true of soap, victrolas, concrete, and even though there are a large number and variety of automobiles, they are all sold under their respective trade names. The production of them has been standardized in their various plants.

But this is not true, except to a very limited degree, in the paper industry. Millions of tons of paper for various uses are put upon the market without any brand, unstandardized, unmarked. The consumer has little if any knowledge as to who produces it, and cares less. The result is that this great volume of unstandardized, unbranded, maverick tonnage cannot be bought with any certainty of price stability by the consuming public.

The only big argument heard in the selling of paper is: "What is the price?" It used to be so in the coal business; a man who quoted the lowest price for 2,000 lbs. of coal got the order. But today, even coal is being sold on the standardized brands of Energy, Smokeless, Jones' High Test, and the like. The question determining the price is "How much water will the 2,000 lbs. of coal evaporate?" That is what determines the price!

Likewise, in the paper business, the manufacturers, instead of turning out tons of paper, some of which even today is obsolete insofar as its economic use is concerned, should be studying the needs of paper consumers, making their papers fill the wants of their consumers, and then go out and tell the qualities of their respective products to the ultimate consumers.

In other words, that thing which is so much desired, a stable paper market, is not to be looked for like a gift from Santa Claus. Neither the paper jobber nor the paper consumer will present a paper market to the producer. The problem of a market lies solely within the control of the producer. By the same token that he invests his money and that of his associates for the purpose of producing paper, so he should invest money for the purpose of providing a continuous, stable outlet for his product at a profit. Mill owners and investors should see to it that their managers and directors create and own a market in fee simple, exactly as they own their mills, factories, water-powers and timber. To own a paper mill and not own a market is to own a liability, as the last six months of 1923 has justly disclosed to a number of paper mill corporations throughout the United States. And the tragedy of it all is that it happens at a time when paper as an economic substitute for high-priced cotton, wool, leather and tin and other commodities is in such tremendous demand; when our own forests are nearing the exhaustion stage, and when we are looking today to fifty years' continuous diminution of paper raw material supplies produced in the United States.

Of course, every mill not only wants a market but needs a market, and that need can be filled only by the producing Company. Collectively, the paper mills of the United States should get together without delay as the lumber, concrete and meat-packing industries have done, and by modern publicity and sales methods sell the paper industry to the public. Secondly, each producing unit in each division of the paper industry should standardize its product; that is, make the paper product that it is best adapted to make as good as possible, as economically as possible, and then create a merchandising department within the control of its own corporation, and by modern, up-to-date, scientific merchandising methods create its own market.

To want is not to have! We have too many mills who have for too long a time been wanting and needing markets. Their need should be the prod, and the experience that they have dearly bought should be the basis for the immediate institution and adoption within their own corporate control of a modern merchandising department. Not to do it is to commit commercial "hari-kari."

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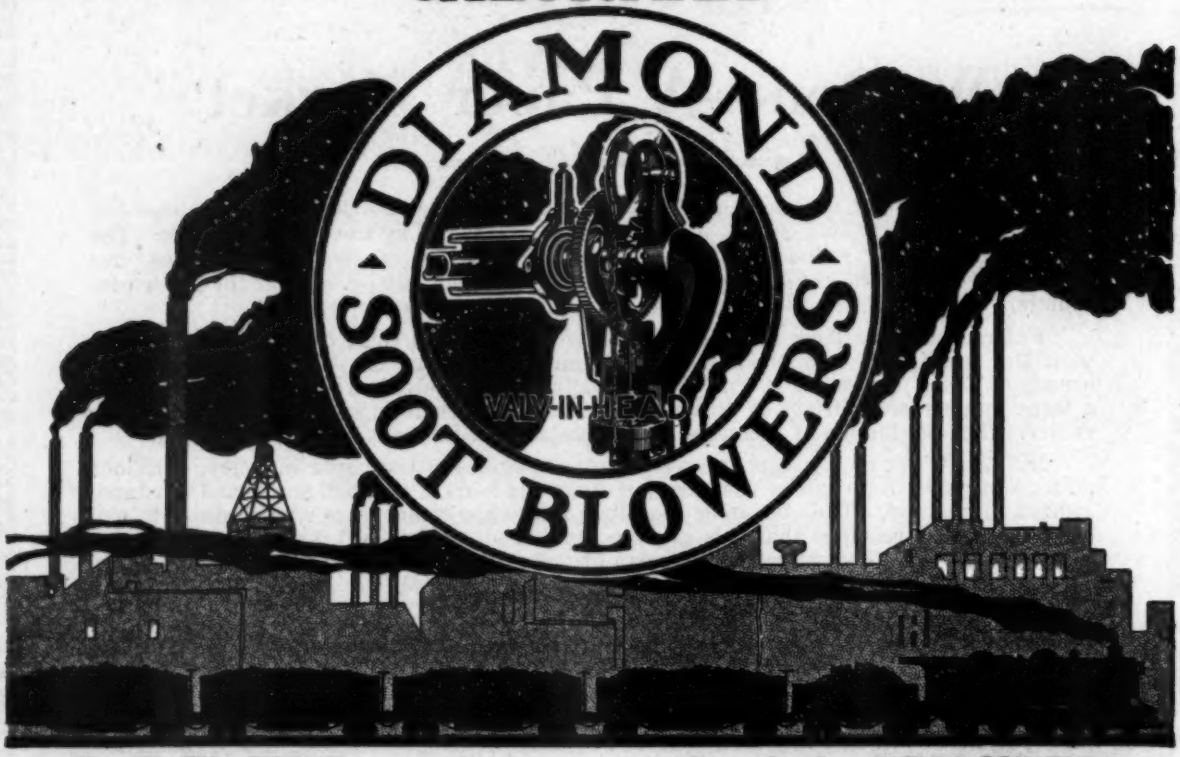

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DIAMOND POWER SPECIALTY CORPORATION
DETROIT, MICHIGAN

EDITORIALS

"Peptimism"—the Slogan

NO year in the history of papermaking has been marked by such a degree of progress as the year, 1923. For whole it is true that aside from a few large projects that have been launched in the United States—as those on the Pacific Coast—most of the new paper and pulp mill construction during the past year has been started in Canada, great sums of money have been spent by our domestic mills in the increase of papermaking equipment, rehabilitating old and worn-out power plants, and in general fitting themselves for the ever increasing demand on paper production.

Since the United States makes about one-half of the world's production of paper, and its consumption is even greater to the extent of about $110,000,000, there is no denying the fact that a great demand exists here, and is ever increasing, and that the necessity is now incumbent upon us to keep it away from the foreign invader.

The annual review of the American Paper and Pulp Association showed a splendid record of progress and achievement for 1923. Among its important activities has been its successful effort so far in preventing the proposed embargo on Canadian pulpwood, which might be mutually injurious to mills on both sides of the line.

As a result of a referendum conducted by the Forestry Committee of the National Chamber of Commerce, this body has been committed to an aggressive national forest policy as advocated by the paper industry. In Wisconsin, the American Paper and Pulp Association lead in the organization of pulp and paper manufacturers to secure legislation to permit the development of permanent forest areas.

The four, so-called working bodies in the Association—TAPPI, Superintendents, Salesmen and Cost Accountants, showed healthy gains in memberships for the year.

The Technical Association, through its research activities, has been solving problems of waste, and making advancement in heat, light and power conditions in the industry; the Superintendents are benefiting by their growth in membership and their local division meetings held at regular intervals, where practical problems are discussed; the Salesmen are working on stabilization of market conditions; and the Cost Association is handling, among its other duties, the tax problems of the industry.

Other important activities are those being carried out by the Woodlands Section of the Association in furnishing to its members detailed information on woods problems; that of the Pulp and Paper Section of the National Safety Council, in formulating a standard code for safe practice in the industry; and the text books on the Manufacture of Pulp and Paper, being prepared under the direction of the Joint Executive Committee on Vocational Education. Co-operation with the government on its standardization proposal, with a view to simplifying sizes and other economic forms of standardization, was another feature of the year's work.

Pep has characterized the year of 1923. Let "Peptimism" continue to carry forward the work of 1924.

Help the Census Bureau

THE Bureau of the Census is now engaged in collecting statistics of manufactures covering the calendar year 1923. These statistics are compiled in accordance with an Act of Congress of March 5, 1919, and the schedules have been prepared after conference with the associations and others interested in the various industries. The schedules were mailed to the manufacturers on January 2 and the Director of the Census is very anxious to publish the statistics at the earliest possible date, in order that they may be of the greatest possible commercial value. The manufacturers engaged in our industry are urgently requested to forward their reports to the bureau at the earliest possible date, preferably before the end of January. The bureau has agreed to tabulate the results for our industry as rapidly as the schedules are received, and publish the totals within a few days after the receipt of the last report.

The bureau has been co-operating very closely with the industry and desires to be of service to us; we should in turn show our appreciation by complying with the request of the director to mail our reports promptly. If the reports are not made by mail it will be necessary for the Government to go to the expense of sending a special agent to the various establishments. It is hoped that our membership and all others engaged in this industry will heartily co-operate and make their reports promptly.

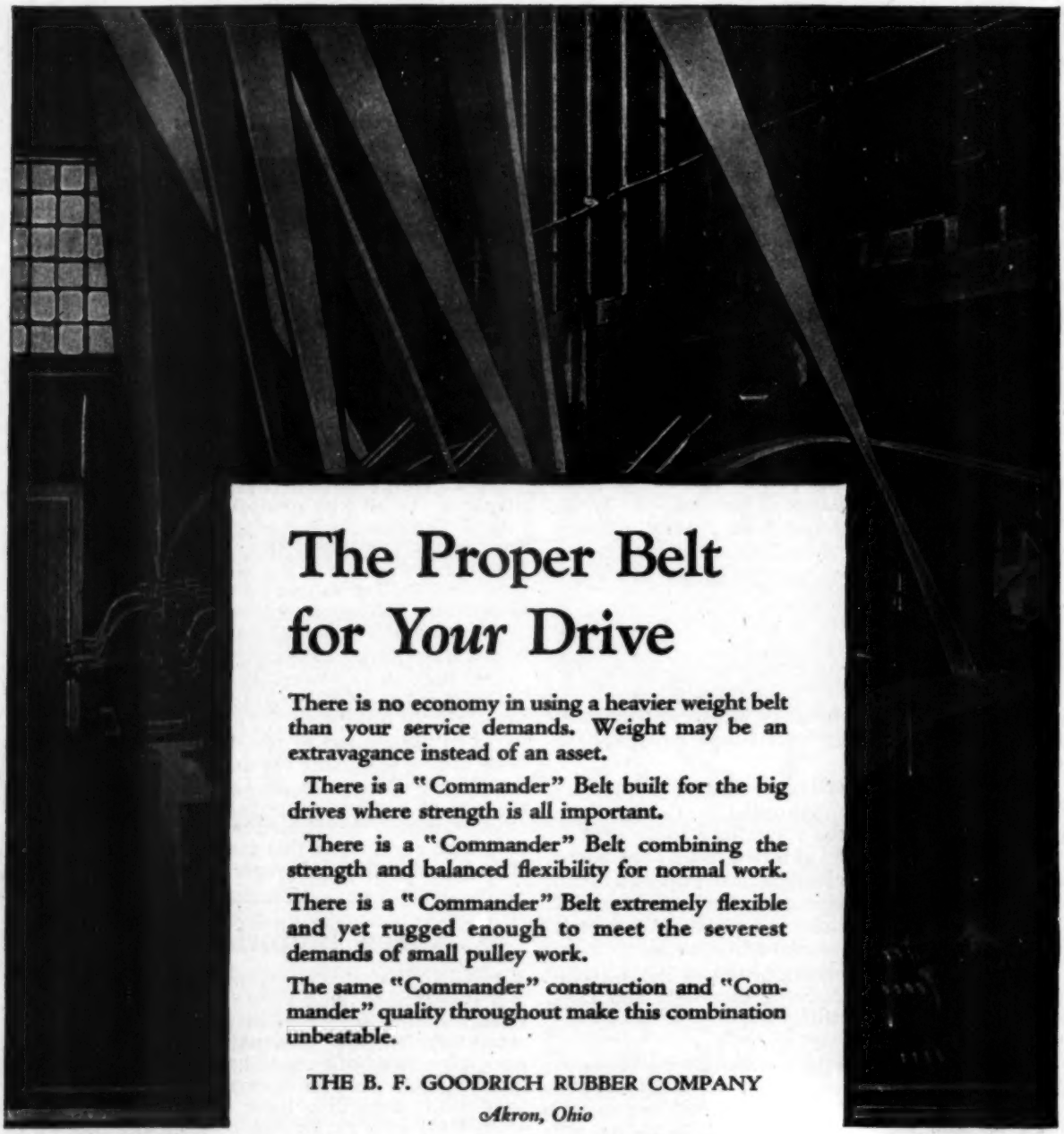
A New Editorial Feature

BEGINNING in this issue will be found a new department called "Editorial Comments on Timely Subjects," by William Sibley. In offering this to our readers, it is with the hope and expectancy that they will read these short articles with interest, and feel free to make whatever comment they desire regarding them. While they will generally deal with topics remote from the making of paper, the subjects treated will be of universal interest, and as such will be intended to be a slight diversion from the regular technical features of our magazine and the industrial news.

An Appreciation

DURING the past month we have received greetings, calendars and remembrances from many of our friends in and without the paper industry. To these well wishers of our magazine we voice our appreciation and congratulations.

In 1924, with the continued help of all our well wishers, we are going to keep THE PAPER INDUSTRY foremost in the field and will continually strive to make it a bigger, better and more useful paper.



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THE PAPER INDUSTRY

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Vol. 5 JANUARY, 1924 No. 10

Improvements in the Design of Pulp and Paper Mills

H. S. TAYLOR
Consulting Engineer

ACTUAL design of pulp and paper mills has changed but little during the past decade, and this condition is natural since the materials used are, with few exceptions, the same. The fundamental processes are primarily the same as they were when such mills as we have in operation today were not even considered by the most progressive manufacturer or engineer.

The reader may say that here is a contradiction, for how can the industry expand and progress as it has without a similar degree of improvement in the design of the mill itself, and the answer is that the same type of mill, to a great extent, has been steadily expanding to meet the demand for greater and greater production from the single mill, whether it be pulp, paper, or the complete unit.

There are those who say that there must be radical changes in the design of the paper mill of the future, that the mill of today has the same appearance as it did years ago, and that it is time to design a mill that is different, and up-to-date, so to speak. The pulp mills, either chemical or mechanical, are rarely mentioned in this respect, although expansion in this type of plant has been as great as in the paper mill, and the possibilities for the future are every bit as great.

The fact that there is little difference in the outward appearance of the mill today and yesterday, and the arrangement of the equipment in the different departments is, in many ways, similar, is the basis of argument for those who call for radical changes. If, however, they of this opinion could be transported from a representative mill of yesterday to that of today without knowledge or experience in the intervening periods, this abrupt change, I believe, would convince the most skeptical that there have been radical improvements in plenty. Not so much in design or processes, perhaps, but in magnitude of plant and equipment, layout and overall efficiency and, what would probably be the most startling, exceedingly greater productions of higher quality and more diversified grades of paper products from the same type of unit that in the mill of yesterday operated with a higher cost per unit of production.

There has been improvement in the mills of the industry during the past few years, and even though it be more in the perfecting of equipment and processes than along new and radical lines, it is important, nevertheless. There has been a certain proportion of this improvement in developing new processes, and the equipment required by them, in the most part necessitated by the conservation of raw materials or reductions in operating costs, and new designs for the mill itself have been inaugurated to provide for the necessary rearrangement of process and equipment.

The pulp and paper industry is a broad one, including as it does a most diversified range of product, with mills almost as much diversified as regards arrangement and design, and what is more, in locations where for the one, winter temperatures and the accompanying climatic conditions are to be met with through the greater part of the year, and the other, where only the higher temperatures are experienced the year round. This latter is a condition that I believe is experienced in such a degree by no other basis industry, and calls for a broad variation in design for the different latitudes that are to be met with.

The characteristics of the mills of the industry which depend on the grade of product manufactured, and for the grades that make up the bulk of the supply, are distinct and individual. These mills we

find located either in proximity to their supply of raw product and power, or their market for finished product, but each mill in a different location irrespective of the grade of product manufactured should be considered as an individual unit from the standpoint of layout and design, as in no two locations will the factors that must be contended with be the same.

The newsprint mill, consisting of paper mill and sulphite and groundwood mills, whether separately installed or as one unit, ranks first in importance as regards volume of production and plant itself. These mills we find scattered from Coast to Coast, and from the North to the South, the larger and more efficient plants, however, being in the North where their proximity to an unlimited supply of hydro-electric power and extensive timber limits is the first necessity.

In this type of mill, perhaps, the greatest strides in improvement have been made, both in arrangement of equipment and buildings, together with the power plant, prime movers, and their application throughout the mill.

The large volumes of power demanded by single units in this type of mill, was in the earlier days, a determining factor in the location and design. We find in these earlier mills a grinder room with grinders direct connected to water wheels in a location that, while necessitated by the water wheel setting, demanded the preparation of pulp for long distance conveyance to the paper mill that, from its own requirement, must necessarily be located where transportation facilities and yard areas would allow its existence.

In many instances this water wheel setting even determined the location of the paper mill itself. This condition as well as that of the grinder room resulted in layouts that were most inefficient from a manufacturing standpoint, but necessary with the water wheel as the only dependable prime mover for transmitting power in volume.

Electricity Advances the Paper Industry

About this time the rapid strides that had been taking place in the improvement of heavy duty electrical equipment, most especially the synchronous motor of high rating, placed this equipment at the disposal of the engineer, with the result that the larger units in the newsprint mill, instead of being located from a power standpoint, were installed where the maximum of operating efficiency could be secured. The power development was also greatly benefited by this change, as the wheel installation could be made to the best advantage from a power efficiency standpoint rather than on a speed basis, as was necessary with equipment connected, speeds of which were constant irrespective of that best suited to the power plant itself.

During this period the paper machine itself was being increased in width and also in speeds year by year, until from the machine of about 100″ at a speed that would produce 25 to 30 tons daily, we have today a machine of 232″ running at a speed that will produce over 100 tons per twenty-four hours continuous performance.

During this period of machine evolution the magazine grinder was placed on the market, the single stone averaging over 20 tons of groundwood per day, against a far lower average for the standard pocket grinder. These magazine grinders are, in the greater number of installations, direct connected to synchronous motors of a rating allowing around 1400 H. P. per grinder, and it is generally conceded that the success of this magazine grinder has depended on development of the synchronous motor.

Probably the greatest improvement in the design of the buildings themselves is in fitting the structures to the equipment in place of the equipment to the structures, the elimination of fire hazards by adhering to a strictly fireproof construction throughout, the abandoning of the former types of high pitched roofs to as flat a roof as permissible from a drainage standpoint, thus increasing the efficiency from a ventilating standpoint, the adoption of train sheds and covered platforms to protect those engaged in the handling and transportation, and a general simplification of the design throughout.

In the equipment the rotary screen has taken the place of the flat screen in the paper mill and elsewhere, for that matter, except on finer grades of product. The Jordan in this type of mill has been dispensed with, thus releasing a considerable volume of power, as well as maintenance expense; the knife barker, with its resultant 10 to 20 per cent loss of wood, has been succeeded by the drum type with its great saving in labor and wood; and the processes for handling the raw pulps and mixing for furnish to the machine has been simplified to such an extent that one progressive mill of the North country, one man per shift handles the entire mixing and pumping arrangement of raw pulps and paper stock from what can be called the mixing room to paper machine.

These several improvements in equipment and design have resulted in the ability to design a complete newsprint plant, with capacity dependent only on power, raw product and area available, under one roof, or sufficiently compact to eliminate the preparation of raw pulps other than in slush form, this one condition alone being perhaps the most important factor in the reduction of cost of production, the minor factors being the elimination of waste and of labor throughout the different processes.

From the above the fact that improvement in the design of the mill is dependent on improvement in the equipment and processes can be readily seen, and

in this industry of ours, as well as in any other industry, research and development work must first be evident in shortening the process and increasing the production through better and more efficient equipment, and improvement to the mill itself will then immediately follow.

After newsprint, the grades of product commonly known as fine papers, including book, writing, and many of the specialties follow. These grades of paper being more often produced by a paper conversion mill alone, the pulps and other ingredients of the furnish being shipped to the mill from outside sources. There are a few complete plants manufacturing the raw stocks required for furnish, as well as the paper itself, but such plants are few as compared with the straight conversion mill that can be found in practically all the principal paper centers of the United States.

Improvements in this type of mill have been mainly through increasing the widths and speeds of paper machines, in perfecting the processes for the improvement in quality and the elimination of waste, the improvements to the buildings themselves being along the same lines as described for the newsprint mill.

In the book papers especially, a considerable percentage of the furnish is now made with old papers, and in order to pulp this product and remove the ink, a number of different deinking systems are on the market. This deinking of old papers is one of the most important improvements that have been made for this type of mill, and as these book grades of product run frequently up to 35 per cent of old papers, the importance of this deinking problem can be realized.

The improvement of the paper machine for producing book papers is on a par with that for newsprint. The machines of comparatively few years ago were narrow in width and slow in speed, whereas today, machines for this grade of product are installed over 170″ in width and designed to run over 800 ft. per minute.

As an example of what these improvements in the book paper mill mean, it can be said that in one of the leading plants a complete two-machine addition was made some few years ago, resulting in an increase of 90 per cent in the production of the mill, with a labor increase of approximately 10 per cent, and with this figure in mind it is comparatively easy to believe that radical improvements have been made, in this mill at least.

Mills for the production of Kraft papers, including the paper mill and the sulphate mill, are a somewhat later addition to the industry. The paper mill itself is, however, similar to that for book papers, with the exception that much greater beater capacity is required in the preparation of the furnish. The paper machines are to a great extent the same type as that required for the finer papers, the balance of the mill being beater room, finishing room and shipping facilities.

Characteristics of Chemical Pulp Mills

The three chemical pulp mills, including that for sulphite, sulphate and soda pulp, each have their own characteristics. The sulphite mill is radically different in many respects, while the sulphate and soda pulp mills are in the main processes very similar. The greater volume of sulphite pulp manufactured going to newsprint as it does, would thus classify this type of mill with the newsprint group, but in that there are a number of independent sulphite mills manufacturing a bleached grade of product for fine papers only, it is preferable in the writer's mind to classify this plant as an individual unit and treat it as such.

Improvement in the sulphite mill has been mainly in equipment. Digesters have been increased in volume from the earlier units with a capacity of 7 to 10 tons, to shells 19 ft. in diameter by 55 ft. high, with a production of around 20 tons per cook. The acid system for the preparation of calcium bisulphite liquor for the cooking process has been simplified and improved.

Rotary sulphur burners have taken the place of the earlier flat burners, combustion chambers have been enlarged and redesigned to insure thorough combustion, the tower system using calcium carbonate has replaced, in the greater number of mills, the older type of milk of lime absorption system, and the recovery system has been so improved that acids of any strength between the maximum and minimum allowable depends only on the adjustment of the system by the operator.

The arrangement of delivery of acid to the digester has been rearranged to eliminate the escape of sulphur gas, with its resultant waste and inconvenience to workmen, and the atmosphere in an up-to-date digester house can now be kept as clear as in any other part of the mill. Rotary screens, except for the finer grades, have replaced the flat screens, with the resultant saving in space and maintenance. Riffler design has been improved and the sulphite mill can today be provided with an arrangement of rifflers that guarantees a cleanliness of product, and general equipment and transmission have been brought up to a greatly increased production and over-all efficiency.

The demand for bleached sulphite for finer grades of product is such that the bleach plant of a mill of this type is a most important part of the installation. Bleaching equipment, up to recently, has mainly consisted of the tub type where the pulp is propelled through the circulation passages during the period of mixture with bleach liquor and through the bleaching process.

Theoretically, there is a considerable saving in

heat, chemicals, and time, in bleaching with higher densities, and to take advantage of this economy bleachers are on the market today for pulp at 20 per cent consistency or slightly over, and with all mechanical difficulties overcome this type of bleacher will, without doubt, supersede the former types.

Liquid chlorine, allowing the mill to make up its bleach liquor, without a cell plant, is a fairly recent step in the bleach industry, and has been accepted as an improvement in mills whose production will not warrant an electrolitic plant of its own. Sulphate pulp is a later product than either sulphite or soda, and the sulphate mill is still in the realm of research and development. This process is objectionable in settled communities due to the offensive odors given off by the gases generated in the cooking and incinerating processes, and schemes of condensing and washing these gases are now being tried out in several mills.

Other improvements are mainly in the recovery plant through the retention of solids in the waste liquors. Continuous filter systems are being installed to aid in this retention, and evaporating and incinerating equipment are being constantly improved to increase the percentage of recovery.

The soda mill is as above stated greatly similar to the sulphate mill, and as both the sulphate and soda processes are applicable to the treatment of species of wood which have formerly been considered inferior for general paper making, and therefore can be found in profusion in many sections of the country where the recognized paper making growths have been cut out, these mills, most especially the sulphate, has excellent prospects for the future.

What is required is a process that will successfully treat hard woods as well as the inferior growths of conifers, and produce a pulp that will take the place of that, so far accepted only from a comparably few species of growth. The chemical engineers of the industry are now hard at work on this problem, and if they should perfect a process whereby even newsprint could be produced of a better grade and with no increased cost from any species of tree growth, and with the one process and pulp only, we would then have the opportunity to make radical changes, and at the same time conserve what is said to be a rapidly diminishing supply of our raw product supply.

Beater Greatly Improved

With reference to improvement in a few general items of equipment we can refer to the beater room, where the standard type of beater is as familiar to the paper mill as any other part of its equipment, and although criticized often and soundly has kept its original design intact until the advent of the so-called high speed beater, some two years ago. This new type is the same old beater, but with the rear end of tub raised to about eight feet, to which height the roll lifts the stock, it being deflected from the roll by a special doctor arrangement. The slope from rear to front end of tub is so increased that circulation of stock within the tub is very nearly trebled, with the result that reports from conservative mills using this type of equipment, agree that time of beating has been cut practically in half but that power per ton is not appreciably decreased, when this type of installation is used for straight beating process.

The high speed beater is becoming more and more popular, and a number of mills are having their standard type of beater changed to the high speed design, which would indicate that this new design has come to stay, and is an improvement over the standard type of equipment.

As a new type of installation for the paper mill the sectional drive for paper machines is now recognized as an onward step, and has been accepted by the progressive manufacturers. The demand for higher speeds without doubt provided the necessity for the separate unit for each driven shaft of the paper machine. The belted and geared lineshaft transmission had given way to the rope drive, that was serviceable for speeds up to about 800 ft. per minute, 1000 ft. was the figure set, however, and the sectional drive was there to meet the issue. This type of drive in eliminating belts and other transmission parts and the attending maintenance and labor, has proved so satisfactory that low speed as well as high speed machines are now so driven, and the operators will testify as to the satisfaction derived, and say that in their minds the former methods of transmission for high speeds at least are gone with the mill of yesterday.

Another general improvement in the paper mill that should be mentioned is that of ventilation. The processes in the pulp or paper mill have always been such that moisture and vapors of high humidity and temperature are released, but little attention was paid to their collection and removal. The fact that for each ton of paper produced in a machine room, two to two and one-half tons of water was driven off, and if not removed, diffused through to the room to saturate the atmosphere and condense on the roof structure and walls, was known, but as this condition did not actually prevent operation, little was done to remedy it. Also the fact that heat contents equivalent to three or more pounds of steam per pound of paper produced was being released to the atmosphere, that although known, was neglected.

Today a proper arrangement of ventilating equipment is provided for all parts of the paper mill, and in the more modern plants economizers are being installed to transfer the heat from the saturated or gaseous vapors to the fresh incoming air, and thus provide the heat content needs from what would otherwise be waste, in place of from the coal pile. In other words, it costs less to properly condition the mill throughout than it does to leave it to the mercy of the processes that go on within it, but it is only

within the last few years that this fact has really become accepted, and even now you will find certain mills that refuse to entertain the installation of modern methods for the removal of moisture laden vapors.

Power Plants Have Progressed

The power plants of the industry, both hydro-electric and steam, have progressed, but the former to a much higher degree than the latter, mainly as the demand for hydro-electric power is from the larger and more modern plants, and for steam from the older and less progressive installations.

Water wheels of increasing rating per unit and of higher efficiency, together with new and more improved types of generating and motive electrical equipment, have given the paper mill engineer the opportunity of making the modern paper mill hydro-electric power plant one that could not have been considered a comparably few years ago, and there is many a mill operating today that could say truthfully, "see what progress has done and where it has left me."

This same hydro-electric plant with its ability to generate and distribute large volumes of low priced electric power is responsible for the electric boiler that has, within the last two years, come on the market and is now included in the power plant of certain northern mills. This electric boiler can be considered an improvement, both hydroelectrically and as a part of the steam plant, although its most simple design as a steam generator, and its entire dependence on a large volume of low priced electric power, places the balance considerably on the side of the hydroelectric plant.

The electric boiler, with a conversion ratio of 10 electrical kilowatts to 1 steam H. P., can be considered only in mills where the continuous power demand is such that there is a considerable volume of excess at frequent intervals, that must be paid for whether used or not, or where large volumes of either primary or secondary electric power are available at a price that will allow the electric boiler to compete with coal or other combustible on the basis of 10 to 1, as above referred to.

This electric boiler has found immediate favor in mills operating under one or other of the above conditions. The writer has had the pleasure of seeing an electrical boiler installation generating continuously some 7,000 to 8,000 B. H. P., the entire demand for a large mill, and the entire installation could have been placed in 1/20 of the volume of a standard steam plant for the same rating. The power in this case was, for the greater part, secondary, with no value otherwise, and under such conditions the saving effected by this equipment can be readily estimated.

The improvement in the average steam plant of the paper mill is not as marked as the times would indicate. High pressures and more modern equipment have been installed in certain of the older, and also the newer installations, but outside of changes that were necessary to meet the lower grades of combustible delivered, and general labor conditions, the average plant is little changed.

Due to this condition, and the fact that the power and steam cost is such an important item in the manufacture of paper and the chemical pulps, the opportunity for improvement in equipment and design of the steam plant is, I believe, more marked than in any other part of the average paper mill of today.

Without doubt, in a given number of years we will look upon at least an equal change and improvement in the mills of the industry. The constant increase in demand for practically all grades of paper products, with new grades coming on the market yearly, makes it most plausible to believe that production will increase as long as raw products are available, and if the radical changes in the mills of the industry that are often spoken of become necessary to meet the issue, it can be said that the manufacturers and engineers of the two paper making nations of this western hemisphere, that by the very use of over 50 per cent of the world's supply of paper products, will see that they are made, and it can be added, "without loss in production."

Cost Figures That Help You Sell

By WILLIAM R. BASSET
President of Miller, Franklin, Basset & Company, Inc.

EVERY manufacturer realizes that when his plant operates at less than capacity, the cost of his product rises. He cannot, however, raise prices to correspond with the costs. Rather, he lowers prices so as to get more work into the plant, and by enabling him to spread the overhead expense over more product to reduce his costs. In this way he attempts to get back the cost of labor and material plus a part of the overhead that goes on whether the plant is busy or not.

Usually the shading of prices for this purpose is done by guess work without a cost system properly designed for the purpose; if so the prices may be cut to an extent that makes the loss greater than it would be if the plant were shut down.

Informative figures can be obtained without an unduly complicated cost system. It simply requires that a normal figure for each item of expense in a department be determined based upon the normal activity of that department.

Each month the normal and actual figures are compared. Those items which fluctuate with the activity of the plant are in one group and those which do not are in another.

Knowing accurately the labor and material cost of the product, it is then possible to accurately determine what the result on profits will be if a given

amount of business is taken at a given price. Unless you have such a method of forecasting costs, your cost system is of doubtful value as a guide in setting selling prices, for business is seldom exactly normal. Actual cost figures must therefore be aided by a knowledge of normals and abnormals.

Identification of Paper Producers, the Purpose of Six Centuries of Watermarking

By WALDON FAWCETT

SINCE paper-marks have enlisted the attention of antiquarians and devotees of the collecting hobby, it has become quite the fashion to scorn or ignore the element of identification in early watermarking practice. The hobby riders who have taken to collecting the water-marks of bygone centuries, as they would collect rare pictures, old books, coins or postage stamps, seem to feel that their fad would lose something of its lure and respectability should it be tainted with a touch of the commercial instead of standing purely aesthetic. So there has been latterly, a determined and persistent effort to implant the idea that there is a wide gulf between the watermarks of the dim past and those of today.

The aim of the hunters of ancient watermarks is to secure acceptance of the theory that the early watermarks performed no function of commercial identification, as does the average watermark in this day and age, but were placed in paper products solely for ornamental purposes. In support of this alibi, the glorifiers of the pioneer watermarks argue that the artisans of the Middle Ages were always artistic or aspired to be artistic and that watermarks were introduced with no trade-marking or advertising purposes but wholly for purposes of embellishment,—to add a finishing touch, as it were, to a perfect piece of work.

Some members of the paper industry may be inclined to think that it does not much matter what romances are woven around the early watermarks, so long as it is obvious that the line of watermark evolution is readily traceable and that the watermarks of today have come down in unbroken succession, as one might say, from those of six hundred odd years ago. However, there are others who would like to have the case proven that the early watermarks were as much distinguishing marks of paper origin—had that primary purpose—as any of the watermarks of the twentieth century. This may appear all the more desirable now that there is a distinct trend in the industry to more ambitious and more elaborate watermarks, watermarks that critical minds appraise as having higher artistic standards than the paper-marks of a few years ago.

History has locked up, past all penetration, absolutely conclusive evidence of the purpose of the early watermarks. But after a careful search of all the records in the library of Congress at Washington and other storehouses of lore of the graphic arts, it may be asserted confidently that there is quite as much if not more evidence that the early watermarks were designed as identification tags, as that they were supplied merely as loving touches of adornment. Take one bit of evidence on which the art hobbyists rely heavily—the circumstance that as many as two score different watermarks are to be found in a single book of the Middle Ages. That simply means, in the estimation of some of the best authorities, that in the early days when production at the average individual producing plant was on a small scale, it was plausible that a number of mills should contribute paper stock for an edition of a book.

The best reason for the assumption that the animus of watermarking was, from the outset, identification of the source of production, is to be found in the fact that human nature does not change with the passing centuries and the average individual who has put the best that is in him into an achievement of any kind likes to have credit, publicly, for whatever degree of success has crowned his effort. Existence of such a spirit would be all the more understandable in the early days when paper making exemplified individual endeavor to a degree that is not practicable, of course, under modern requirements of production. This principle is due for recognition even if there be evidence that, on occasion, in the early history of watermarking several mills used the same mark simultaneously. And, all else aside, it is a fair guess that the early paper maker was quite as keen for repeat orders as is his modern prototype who relies upon his watermark to bring back the satisfied customer.

Certain observers of the watermark procession have jumped to the conclusion that marking motives have changed with the passing centuries because instead of the brand names, surnames and corporate names which predominate in paperdom today, the early watermarks were almost without exception fan-

ciful designs such as geometrical figures, allegorical representations, or outlines of the heavenly constellations. Watermarking appears to have been, from the beginning, alike to so many other developments, a matter of changing fashions. The first known watermark, bearing date of 1301, consists of a circle or globe surmounted by a cross, and with this as a starter it was perhaps natural that the progression should be through the mazes of mathematical figures, representations of animals, birds, fruits and flowers, to the coats-of-arms and other intricate patterns of the 16th century.

Very Little Change in Watermarks

To indicate that there is not necessarily hidden significance in the forms of watermark expression one has only to recall that in this competitive age, when commercial considerations might seem to counsel name display, there are not a few paper producers who pin their faith to symbols. Similarly, even in the earliest days, there were some paper makers who watermarked with their own names even as is the custom today when the watermarked name has become so distinctly a guaranty of quality or a pledge of integrity based on established reputation. Initials appeared also in the early stages of watermarking and in some instances there appeared in conjunction a name or initial and an emblem, such as the ever popular fleur de lis.

That the use of insignia or pictorial designs in a majority of the ancestors of our modern watermarks did not impair the commercial functions of the early marks will appear clearly enough when we consider the different marketing conditions that obtained some centuries back. There were in the trade a comparatively small number of paper makers; they appealed to a limited clientele of customers, and the output of the average plant was sold within a relatively restricted geographical area. Given this state of affairs, and it may readily be surmised that the average paper customer would have no difficulty in remembering all the marks upon which he would have occasion to rely as buying guides. The number would never be so numerous, probably, that he could not call them to mind at will, whether names or symbols.

Proof that watermarks served, from the beginning, practical purposes of identification is found further in the fact that in Germany marks of different kinds or different dimensions were used for papers of different sizes. That there was ambition, far back, even as today, to gain recognition for certain communities as centers of the paper making industry may be surmised from the grant of concessions to use place-marks or heraldic designs as watermarks. At an early date the paper mill at Dresden was given an exclusive right to make paper carrying the Dresden arms as a watermark. In the seventeenth century the Privy Council of Scotland, by way of encouraging the infant industry, gave permission to put the coat-of-arms of the kingdom upon the paper which should be made in the Scotch mills. Indeed, the study of the history of paper making will show that, from the date of their first introduction, watermarks took on peculiar significance as identifying marks. A majority, if not all the paper mills of early times, were owned or controlled by powerful families or monasteries and had special rights, monopolies and privileges which were signaled by the watermarks.

Just here it is necessary, in the interest of accuracy, to shatter one of the traditions dear to the heart of the paper industry. Handed down to this generation is the pleasant fable that a number of well-known trade terms, such as "crown," "post," "elephant," "foolscap," etc., owe their origin to famous watermarks of the dim past. The most dependable historians challenge these romantic stories. They insist, for example, that the term "foolscap" was derived from "foglio-capo," the Italian for a folio-sized sheet, and did not spring from the representation of a fool with cap and bells, which was the crest of Spielman, the jeweler to Queen Elizabeth, who carried on paper making as a side line and who, in the latter capacity, furnished the stock for the first folio of Shakespeare.

Customers Specified Own Watermarks

Suspicion in some quarters that the early watermarks did not point to sources of manufacture to the extent that our current watermarks do, has been fostered partly because some of the early consumers of paper drew their supplies from alien sources, and this imported paper was watermarked to order very much as private branders to the trade now meet the watermark specifications of their customers. Even as late as the early part of the eighteenth century most of the watermarked paper used in England was made abroad. To humor this trade, odd conceits were introduced, for example, Caxton's "Game of Chess" which mustered more than fifty different designs of watermarks. The Britannia mark, which is in use to this day on British foolscap, seems to have had some such origin. In the days when the British ordered their foolscap overseas, the paper makers who supplied them began a series of "Pro Patria" watermarks with different designs of a female figure within a fence, which developed in due course into the familiar representation of Britannia. The unanimous opinion of present-day trade-mark experts is that the watermark is the ideal form of trade-mark "carrier" because it is unobtrusive yet indelible and can be counted upon to endure as long as the merchandise which it identifies. That this serviceability was sensed from the earliest days would seem to be the only explanation of the rapidity of the spread of the practice of watermarking. Before the close of the 14th century there were hun-

dreds of different watermarks in use and in the 16th century thousands of marks of this type were current. In France alone, reputed birthplace of the watermark, more than six hundred watermarks were listed as in use in the 14th and 15th centuries. This spurt of watermarking occurred despite the fact that at the period mentioned the use of paper was restricted to people of culture, learning and means, who formed, of course, a small proportion of the population.

As an aside and to anticipate a probable question, it may be confessed that it is exceedingly difficult to pin down history as to the origin or application of the term "watermark." Indeed, the word seems to be in more extensive use today than it was in the earlier reaches of the paper making industry. In England a century ago the term "papermark" was used more frequently than watermark, albeit the two terms were employed interchangeably. Watermark was hailed as an appropriate term, because it was only possible to produce a watermark in a paper while the paper was in a very wet condition or while it contained a considerable amount of moisture. One member of the paper industry, who has given some thought to the subject, believes that the term "watermark" originated from the fact that the water left the pulp in the process of manufacture where moulds were used in which suction was employed or by the machine process in which the mark was impressed by the suction of water through the vacuum boxes. Some critics have grumbled that there is no more warrant for using the word watermark than for coining the term "waterpaper." However, the designation "watermark" having been continuously in use for one and one-third centuries may be expected to endure.

If the modern paper making industry ever gets away from the grumbling of the exacting folks who consider the majority of contemporary watermarks needlessly plain or commonplace, it will probably be due to latter day refinements of the watermaking process. As leading up to these it may be worth while to have a hasty glance at the evolution since the early days of autographing paper, whether the process be characterized as "wiremarking," "watermarking," or "papermarking." As our readers must fully realize, there is a school of opinion which holds that the watermarks made upon machine-made paper will never be equal to the watermarks upon handmade sheets, but this is a question that is open to debate. But if chemical wood pulp does not lend itself as does rag to the execution of fine watermarking, there is the compensating advantage that the technique of manufacture has been improved in countless minor ways, notably since the invention in the last century of the so-called dandy roll, which was at first dubbed a "riding roll," but was nicknamed "dandy" in quotation of the enthusiastic word of praise applied by a member of the trade in England.

It is the habit in the paper industry and in the world at large to say that watermarking is done today in the same general manner that it was six centuries ago. That takes no heed of two notable innovations that must be looked to for future advances in watermarking. These new departures in practice comprise shaded watermarking and colored watermarking. Shaded watermarking has been known for more than two-thirds of a century, but it is only within recent years that the possibilities of the process for fine gradations of tone have been fully revealed. In shaded watermarking the design may be engraved upon a plate and transferred to the wire gauze, or an electrotype may be obtained and pressed on contact with the wire gauze. The photo mechanical process has been rejected by most experimenters as not affording sufficient relief.

Color Watermarks Expensive to Produce

Watermarking in color might be described, in homely phrase, as originating in a sandwich process whereby a layer carrying any appropriate design in color is enclosed between two plain sheets, making each assembled or completed sheet three-ply, so to speak. That was the technique more than a century ago when the colored mark covered top and bottom with a veneer of plain pulp, was proposed as a protection against the forgery or counterfeiting of Bank of England notes, and that is substantially the only form of procedure that is known today. The problem of producing colored watermarks cheaply by mechanical means has thus far baffled inventors. Until this is solved it cannot be expected that watermarking in color, for all the beautiful effects that the medium makes possible, will find extensive use commercially.

Recent developments indicate that the initiative for improvements in papermarking is not to rest entirely with the paper makers. The demands of certain special classes of consumers are coming to be couched in terms of watermark expression. The personal watermarking of stationery, that is to say, incorporation in the paper of the user's surname, corporate name, or even the portrait of an individual, is a fad of the period which, for all the expense attached, seems to be spreading. There is likewise new interest in the recourse to watermarks to checkmate forgers and counterfeiters of governmental securities.

As may be surmised from a reference above, the idea of invoking the distinctive watermark to increase the difficulties of currency counterfeiting is by no means new. Despite the apparent value of the plan, it has never, however, found extensive adoption, most governments preferring to depend upon the printed designs of their bank notes for protection against imitation. Lately the idea of the water-

mark as an extra protection for securities menaced by counterfeiting via photography, has taken on a new lease of life. The United States Government, which has led all the nations of the world in the employment of currency papers characterized by distinctive silk fibers, has, in the preparation of a new series of standardized currency designs seriously considered whether it would not be wise to, in superabundance of caution, provide in the paper a watermark the imitation of which could be penalized.

Some of the members of the paper trade who believe the day is coming when the industry as a whole will devote more attention to the artistic side of watermarking, have the inspiration that it would be a fortunate outcome if this interest should take the form of a revival of the noteworthy symbolic designs of the early American papermakers who thrived during the first half of the last century. Many of these old marks have long since been so definitely "abandoned" by the original users and their successors that there would seem to be no question of misappropriation in their resurrection. Some of the early American watermarks, dating as far back as 1690, were partnership names or the initials of individuals in the trade. But there were early designs, such as the clover leaf, the dove and olive, the ivy leaf, the post horn, etc., which might fittingly be restored to commerce in tribute to the best traditions of American paper making.

A Comment

IN THE regular monthly serial "Pointers for the Engineer," written by W. F. Schaphorst, M. E., for December, 1923, appeared an article "Why Do Boilers Explode?" A comment concerning same has been received and is being published herein for the information of our readers and for the opportunity of discussion.

"To THE PAPER INDUSTRY:

"In your issue for December, 1923, I observe an article by W. T. Schaphorst entitled "Why Do Boilers Explode?" Without commenting on matter relating strictly to explosions, I will refer only to the last two paragraphs. It is unfortunate that a writer who seeks to instruct the uninformed should himself be uninformed.

"He mentions, what he states to be a fact, that water tube boiler explosions are seldom as violent as those of fire tube boilers. If he includes in this list the explosions of tubes and headers, that may be true, but there have been so many tremendously violent explosions of water tube boilers he is not justified in putting the matter as he does. If he will consider the explosions at Los Angeles, St. Louis, Mobile and Milwaukee, to say nothing of others that have occurred, he will find that nothing was ever more violent than these. He then proceeds to tell why fire tube explosions are more violent than those of water tube boilers, and states that the reason is well understood. This reason he gives as being that fire tube boilers contain a larger amount of water than water tube boilers and even states that it may be five times as much.

"When people speak of fire tube boilers they usually mean horizontal return tubular boilers, and the truth of the matter is that they contain less water per horse power than any make of water tube boilers that occurs to me now. This is a very common error and is probably due to the statements by salesmen of water tube boilers. The ordinary person in thinking of the water tube boiler thinks only of the tubes and not of the headers and drums. There may be some horizontal return tubular boilers that contain more water per horse power, but if so they are not designed as they should be. Many years ago I had some doubt of the prevailing belief and computed the quantity of water in certain H. R. T. boilers and certain water tube boilers of which I had drawings. I found that in no case did the H. R. T. boiler contain as much water per horse power as water tubes. Even without any computations, a little thought will show that the probability is in favor of the H. R. T. boiler, for the shell is pretty well filled with tubes and there is not much room left for water.

"The belief in regard to this is on a par with that in regard to other features of H. R. T. boilers, namely, that they cannot be forced, that they do not circulate and that they are dangerous, neither of which is true. The only boilers that explode now-a-days if we consider only the H. R. T. boilers built with butt joints are water tube boilers. Every now and then there is an explosion of an H. R. T. boiler that is built with lap joints, and if anybody sees an account of an explosion of that type of boiler it is not necessay to even ask the question, whether it had lap joints or butt joints. It will always be found to have lap joints.

"I am very anxious to make this statement because it is time that the time-worn fallacies with reference to these matters should be retired.

"F. W. D."

"Here's What We Want"

Give me the chap with the watchful gaze,
Who guides the paper through the intricate maze.
The chap who drills in the machine room heat—
The man of muscle and strong heart-beat.
The man with a smile and an appetite,
Who toils at his job and does it just right—
"He's safe, and it's safe to work with him."

—Broke Hustler.

The skillful worker is the safe worker, says the National Safety Council.

Thanksgiving Day dinner served in the machine room of the Morris Paper Mills, at Morris, Ill. Who wouldn't feel and look happy as well as thankful after such a feast in such a place?

The way they do it in the Morris Paper Mills, Morris, Ill. This mill has proven that the electric is an ideal machine around a paper mill, not only to handle the product of the mill, but innumerable other things that must be moved from place to place. Each machine has replaced five men, as well as tired backs, and incidentally they have proven profitable for the company.

Plater Room Management

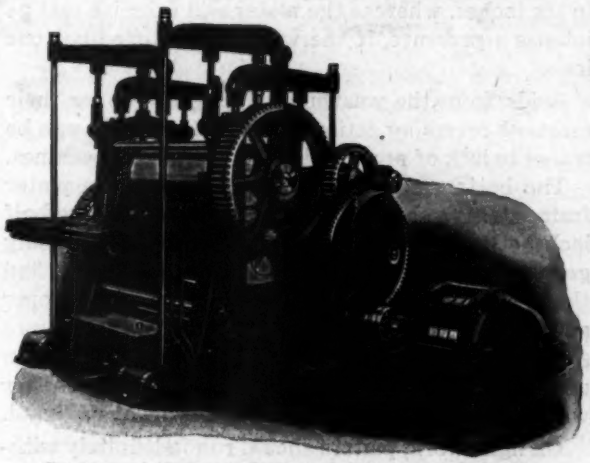
By H. M. GRASSELT

THE modern plater evolved from a machine used in paper mills to produce "plate glazing" to hand-made and other high-grade sheeted papers. The process of finishing was fundamentally the same as today; namely, application of heavy pressure to sheets, placed between polished plates of zinc or copper and made into bundles, by being passed between two strong rolls. The old-type platers were constructed with a very limited space between the rolls and with an adjustment of about three-fourths of an inch. The daily output was correspondingly small, and with the increased use of this class of machines the demand arose for a larger space between the rolls and a wider range of adjustment. The manufacturers met the exigency through the construction of a new type of plater which had a minimum space of three-fourths of an inch, with the bottom roll adjustable the same width, thus obtaining a maximum space of one and one-half inches. This plater had the disadvantage of having the gears connecting the rolls with very long teeth, which easily broke whenever the rolls were adjusted to the maximum opening.

The introduction of linen and special surfacings to sheet papers and the resultant bulkier bundles created a demand for a machine with a still wider range of adjustment, and the belt-driven plater, with a maximum opening of or up to four and one-half inches, with independent drives for top and bottom rolls, was put on the market. An improved method of gearing has eliminated the danger of breakage; a power attachment enables making a quick adjustment, and an indicator, which shows at all times the space between the rolls, helps to obtain a larger and better production. In this type, the gears are accurately cut; the pinions, meshing with the large gears on the rolls, are made of steel forgings, while the pinion on the pulley shaft is made of bronze. The pulleys are bushed with bronze and are self-oiling; pressure levers are of steel, fitted with sectional weights, and the tables are fastened to the bottom box, the rear table being provided with a counterweighed slide for returning the pack. Both front and back tables are fitted with accurately turned iron rolls. The maximum pressure in these platers is approximately from fifty to eighty tons on the form passing between the rolls; the amount of pressure depending, of course, entirely on the size of the plater.

The preceding mentioned improvements to the belt-driven platers have eliminated the continual expenses for replacing broken gears, and the attendant loss of time and production. The independent drive for top and bottom rolls permits a wider range of opening between the plater rolls, and thus yields a corresponding higher production.

The latest type of platers is the Improved Plater, with direct connected reversing motor drive. It has no counter-shafts and oily bearings, nor frequent expensive replacements of belts, made necessary in belt-driven platers because of the extremely heavy strain and constant reversals. It requires less power and space, and its daily output is larger at lower costs.



Courtesy of Norwood Engineering Co.,
Plater with direct connected reversing motor drive

The advantages of this type over the belt-driven platers are the following:

Twenty percent higher speed of the plater rolls; at least 25 percent more production, and approximately 15 percent less power used. (An article by A. F. Paige on the Modern Paper Plater Drive, published in the September issue of THE PAPER INDUSTRY, describes this plater minutely.)

Belt-driven platers can easily be changed over to motor-driven machines. The advantages gained thereby will pay for the cost of changing within a comparatively short time.

Platers are built, as a rule, from twenty-four to forty-eight inches wide, weighing on their foundations from seven to twelve tons respectively. Generally, 36-inch platers are in use, but the tendency in recent years has been to install platers of forty inches width. On belt-driven machines of intermediate and later date, the rolls run at a speed of 15 R.P.M.; those of the direct connected motor-driven platers run 18 R.P.M. The average diameter of rolls in platers of 30 in. to 48 in. width is 17 inches. The maximum pressure on the forms passing between the rolls is about 65 tons in a 36 in. plater, and about 78 tons in one of 40 in. width. For light work, platers

use approximately 8 horse power, for intermediate work 12, and for heavy work 15.

Upkeep

The character of work on platers is extremely severe, and the machines are built accordingly to withstand the heavy strain. Nevertheless, a systematic inspection, proper lubrication and correct adjustment of the machine will add considerable to its permanent working order and attainment of maximum results. Weight rods must be tight and carefully adjusted so that the weights will lift evenly and insure a uniform finish. Many operators entertain the erroneous idea that, in order to obtain maximum pressure on the form, the bottom weights have to be lifted from four to six inches, whereas the plater will exercise just as intense a pressure, if the weights are lifted but one inch.

Aside from the wearing out of gears under their constant reversing action, most plater breaks can be traced to lack of proper adjustments in the machines.

The bottom roll should never rest on the plater frames, there should be at least a space of one-half inch between them and the roll rest on the raising gear. Rod arms must be straight at all times; to find them pitched up or sagging is a sign of improper adjustment of the plater. Belt-driven machines should be provided with endless leather belts. In using belt hooks the possibility of striking the shifter with the hooks and tearing the belt is always at hand.

On light work, platers should run indefinitely without repairs; the same is true to a limited degree on intermediate demands. Heavy work, of course, will cause more breaks with replacements. However, even here, repairs are on a comparatively small scale, if the nature of the work is taken into consideration. Furthermore, proper care on part of the operator, methodical weekly (or more frequent) inspections of the machines and continuous accurate adjustments will prevent many breaks and resultant shut-downs.

Operations

An important prerequisite to efficacious plater-room work is the arrangement of platers and tables. The arrangement and lay-out must be in conformity to the various phases of procedure, so that the product can be moved from one operation to the next without much extra handling or trucking, and thus eliminate interruptions and waste of time.

It requires only two women to make up a table, that is, work on one form or book. Some mills put three women to that work, which in no way increases the production, but adds to the cost. During the work, the women will throw out any torn or dirty sheets and thus render subsequent sorting unnecessary. They also will remove defective linen, etc., or zincs, and replace them in order to always keep the book up to the required standard number of sheets.

Since the books consist of a fixed number of sheets, the plater women also will put up the plated stock in reams.

In some mills the practice prevails of assigning certain books to a particular table and team of plater women, for the purpose of making them more careful in handling the property, and to increase their efficiency on the respective grades of surfacing. While this method of labor distribution may be all right as long as the employees work at day rates, it is rather objectionable whenever the plating is done at piece work rates. Hence, a just distribution of the various styles of finishes, whereby no favoritism is evinced, will greatly help toward better co-operation and discipline.

To facilitate operations, a portable platform of sufficient height should be provided for the transportation of the books from the tables to the platers and back.

The plater man (operator) will regulate his operations in accordance to the finish required and the condition of the paper. He will pass the book back and forth between the rolls the "long way" and the "broad way," to obtain a uniformly surfaced sheet. Books that have been used a great length of time become, first of all, thin around the edges and at the corners and would leave unfinished or insufficiently finished edges and corners in the paper, if it were put through the rolls but one way.

It is very important to always very closely inspect the first few finished sheets of a new run and compare the surfacing to the standard sample. If unsatisfactory, the pressure and the number of times of passing the book through the rolls have to be regulated to meet the requirements. Insufficient pressure will leave the paper with a poor finish, whereas at an excessive pressure the linen will cut into the sheet and blacken it, especially sulphite papers and low-priced papeteries. Plated single sheet linen finish will easily show these defects and the plater man will, therefore, have to use increased care in his work.

An inspector will suffice to attend to the output of five or six platers with five tables each. The number of floormen or general helpers, who supply the plater girls with paper and make themselves useful all around, depends on the arrangement of equipment, intra-factory transportation and other conditions that have a bearing on their work.

Making the "Books"

Forms or "books" are made up of linen, zincs, press boards and so on, according to the surface desired. Sectional and single sheet linen finish, vellum and bond surfacings are the present prevailing styles of plater finish.

Books for sectional linen finish consist of about 180 sheets of linen. The paper is stacked in the book in sections of ten sheets, with a zinc plate between every section, and thin sheet irons at the top and

bottom. The linen for these books should be pasted two-ply, that is, two sheets together, to prolong their life and facilitate finishing. In pasting linen, animal glue will prove quite satisfactory.

Books for single linen finish contain about 160 linens and 80 zincs, with one sheet-iron or heavier zinc plate at top and bottom. The linens are kept single in this book, as this particular class of surfacing requires a very pronounced, clear-cut imitation of linen on the surface as well as in the sheet itself.

Books for plater vellum finish are made up of strong, heavy paper, pasted two-ply, and used in sections of twenty sheets. Bond finish is obtained with pressboards made into books similar to those used for plater vellum.

Bond papers up to 16 lbs. folio may be finished advantageously on the platers, as this method of finishing causes less broke and costs less than calender finish, aside from producing a very uniform, satisfactory surface.

High plate finish is procured on zinc plates exclusively, and is required for Bristols and similar grades.

There exist many fancy finishes, which frequently are just a seasonal fad. They very seldom prove to be profitable and earn adequate returns on the investment, as usually these odd patterns are ordered in rather small quantities and at long intervals, if any repeat orders at all. Now and then a manufacturer may bring out a fancy pattern, which will become popular with one or the other of his convertor customers, or the latter himself may suggest a definite individual fancy finish that he wishes to market. However, the average fancy pattern will not produce returns large enough to justify making up of expensive books, that cannot be used for anything else.

Fancy books are made up by pasting coarse fabrics, etc., of weird and individual texture between single sheets of linen.

It pays to buy only the best linen obtainable, as these alone will prove profitable in the long run. Imported Irish linen offers a superior material for plater books. Linens must be free from knots and other defects.

To derive maximum service from the books necessitates keeping them always in good working order. Linen has the tendency to curl under the constant pressure the books are put up to. A damp piece of cloth rubbed over the curled or wrinkled sheet of linen will eliminate these defects. Zincs must be kept clean and trimmed squarely, as they easily become stretched and thin or cracked around edges and corners, which will either leave the paper with improperly finished edges and corners, or even tear it.

A good way of keeping linen flat, the zinc free from ridges, and the book in good shape generally, is to have it filled at opposite ends every other filling.

For single sheet finish, a No. 9 zinc for the inside and No. 14 for the outside, for sectional linen finish, No. 14 unpolished zinc may be used advantageously.

Mills with many platers should have a person that attends to the upkeep of books. After a book has been used, defective linens and zincs have to be removed and replaced, wrinkled and curled linen straightened out, zincs trimmed and cleaned, etc.; in short, the book put in shape for future use. Although plater girls generally have to take care of these details, it is advisable to have an inspector look after the books and do the necessary work pertaining thereto. The inspector can also take care of the linen room, cut sheets for new books and assist the foreman in clerical work.

Books are to be given a number and kept carefully stored and intact when not used.

Form No. 1 represents a suitable record for individual books. It is of great value to the foreman, as it furnishes him with complete data about the exact cost of the book, total production derived from it, and other details. It has the advantage of requiring very little work; a few minutes a day will be sufficient to fill in the required details. Its further usefulness in determining the correct rate for plater supplies per hundred pounds of plated stock, as required for cost work, will be fully explained in the following chapter on Costkeeping.

Books with worn-out edges and unfit for the size they originally were made up for are, of course, cut down to fit the next smaller size of paper, and that practice continued until the minimum size has been reached and the book is totally inapplicable for further surfacing.

Discarded plater supplies, such as linen, zincs, etc., should be stored and sold at opportune times. Many shoe factories, for instance, buy discarded plater linens for use between soles, in order to prevent the disreputable "squeaking." There is always a market for discarded zincs and zinc trimmings, and the returns realized will pay many times for the small efforts of collecting and storing them.

Conditioning of Paper

Machine-dried papeterie papers, bonds, etc., for subsequent linen or special surfacing on platers, should never be calendered, but kept machine finished and bulky and soft. Papers are to be made "long-fold," that is, in a 22x34 sheet, the grain running parallel to the 34-inch dimension. "Broad-fold" sheets, that is, the grain running parallel to the 22-inch dimension, very often cause considerable trouble in the process of surfacing, especially in coarse grades, and furnish an excessive percentage of broke, wrinkle the linen and curtail the daily output. It is, therefore, more economical to sacrifice a few inches deckle on the paper machine than to make the stock broad-fold in order to obtain a better "fill," and perhaps then derive twenty or more per cent. broke on the platers in addition to other expensive troubles.

Papers intended for subsequent surfacing have to be cut three-fourths of an inch wider and one inch longer, to leave a sufficiently large edge for trimming.

Book No.....

Date started..... Date taken off.....

Size of new book..... Size of rough paper.....

Minimum size book..... Size of trimmed paper.....

Papers finished on this book..... Finish.....

Sections.....Sheets to Section.....Sheets in Book.....Linens.....Zincs.....

Kind of plate (Linen)..... Cost per plate.....Total.....

Kind of zinc (outside)..... Cost per plate.....Total.....

Kind of zinc (inside)..... Cost per plate.....Total.....

First Cost of Book.....$.....

Total lbs. finished..... Additions.....$.....

Cost per lb..... Total.....$.....

Additions to Book						Production derived from book					
Date	Issued	Cost	Date	Issued	Cost	Date	Lbs.	Date	Lbs.	Date	Lbs.
Totals											

Form No. 1—Size 11 by 14 inches

Too small an allowance ofttimes leaves the plated and trimmed sheet with an unfinished edge.

The procurement of good surfacings depends to a great extent on the appropriate conditioning of the rough stock. Condition is done in sweat boxes, that is to say, small low rooms with steam pipes about two feet from the floor around the walls and equipped with loft poles, on which the paper is hung in sections of about seventy sheets. A fine spray of cold water is then applied along the edges of the paper and the steam admitted. The duration of conditioning is to be adjusted to the grade and the condition of the rough stock. So a soft, machine-dried paper will require less time than a hard-sized, loft-dried sheet. The average duration of conditioning in the sweat boxes is about six hours.

The conditioned stock is to be put on platforms for a reasonable period, at least a day, to allow the moisture ample time to uniformly penetrate the sheets. A very thin spray in the post-seasoning room will prevent drying out of the edges of the stock. Only a uniform and thoroughly conditioned sheet will procure an all-around satisfactory surfacing, and the process of conditioning is, therefore, of the utmost importance to ultimate results.

The foreman in charge of the plater room should issue a written order to the man working in the sweat boxes, which briefly states which production order, etc., to take and how long to condition the stock. The order will also contain the grade of paper, size and weight, quantity and the number of the book it is intended for. The foreman will retain a duplicate for the purpose of following up the work.

It is furthermore advisable to adopt a simple method of following up plater orders, so that promises for deliveries may be met promptly.

Method of Payment

The character of plater room work points to the application of piece rates for platermen and platerwomen as the most suitable method of compensation that will insure maximum results in quality and quantity, and reward the employees commensurate to their increased efforts, skill and assiduity.

Plater work is no sinecure by any means for either

men or women, and even exceptional high day rates frequently will not prevent an excessive labor turnover in this class of work. Especially paper mills located in or close to industrial centers, where in normal times employment in other lines may easily be obtained, will find that a fair piece rate constitutes the only effective incentive to keep the plater room help satisfied and on the job.

The large variance in sizes and weights of papers and the application of diverse finishes necessitates a thorough study and investigation of conditions and performances, as well as quantities, which represent a more or less conjectural "fair day's work." The thus ascertained results, supported by records of past performances and considerative consultation of prevalent day rates, form the fundamentals of fair piece rates.

Piece rates, of course, are applicable to direct labor only, namely, platermen (operators) and platerwomen. Floormen, inspectors and general helpers are paid at day rates and included in the overhead expenses.

Beginners should be paid the established day rate for that class of work, until they reach proficiency in the work and are able to make at least an equivalent day's pay at piece work rates. The apprentice must be given a definite period for learning. Two weeks are quite sufficient to acquire skill and speed in the execution of the work and many young girls become experts in the line within a few days, while women of more advanced years very seldom, if ever, attain highest efficiency.

Costkeeping

To obtain accurate costs on plater operation is comparatively easy, and can be accomplished with a few simple forms and without great expenditures or additional help. The two interspersed forms cover the whole procedure as far as surfacing proper is concerned. A modification to meet individual needs and to properly tie them up with other cost work, can be carried out with no difficulty whatsoever.

These forms cover Direct Labor, Supplies and Overhead Expenses—the three components of plater finish costs (factory costs).

The cost of direct labor includes the wages paid to platermen (operators) and platerwomen only, regardless of the method of wage payment.

It will be found necessary to determine a correct rate for plater supplies (linen, zincs, irons, etc.) for the unit of 100 lbs. plated paper, since the nature of those commodities and the length of service of the books does not permit charging of their actual cost to the individual production order or cost period tonnage. The computed cost of the plater supplies, over a certain normal operating period, and the total normal production attained in that period will offer the necessary basis for establishing a correct fixed rate.

Of course, it will be found an indispensable necessity to introduce separate rates for the various classes of surfacing. Fundamentally, four separate rates should suffice for the average plater room: viz., (1) single sheet linen finish or special fabric finish, such as fancy surfacing; this rate will be the highest, whereas for (2) sectional linen finish, a rate of approximately two-thirds of the former covers the cost of supplies; the rate for (3) plate vellum and bond finish is still lower, and (4) plate finish, logically will show the lowest rate for plater supplies.

The interspersed form No. 1, besides being a complete record of individual books, offers a means of ascertaining the needed basic figures for the supply rate, as it contains a complete statistic of the original, additional and total cost of a book, and the production obtained with it. It will be noticed that the

Production No..... Style of Finish..... Date.....

Finishing No..... Promised for.....

Grade..... Size and Weight..... Color..... Watermark..... Quantity ordered.....

Date	Rough Paper	Direct Labor			Supplies	Overhead Expenses						Total	
						3 Tables		4 Tables		5 Tables			
		Cost	Rms.	Lbs.	Cost	Hrs.	Cost	Hrs.	Cost	Hrs.	Cost		

Total rough paper..... Actual Broke.....

Paper finished..... Per cent Finishing Waste.....

Calculated Broke..... Fin. Cost per 100 lbs. $.....

Form No. 2—Size 10 by 8½ inches

DAILY PLATER REPORT

Date..... Plater No.....

Clock No.....Platerman.....Clock No.....Girl.....

Clock No.....Girl.....

Production Order	Time on Order	Size	Wt.	Grade of Paper	Style of Finish	Book No.	Produced		Rate per Rm.		Earnings			
							Rms.	Lbs.	Girl	Man	Girls		Man	

Foreman..... Totals.....

Form No. 3—Size 5½ by 8½ inches

specimen shows the entire production with a particular book, not only in its original form, but also after it has been cut down to the minimum size. Hence, it will be possible to obtain an accurate rate for supplies, which is to be used for that particular style of finish which the books are intended. Fluctuations of prices of plater supplies, of course, render necessary a revision of rates.

Overhead expenses include all other expenditures, such as administrative costs, salaries of foremen and indirect labor, apportioned cost of heat, light, power and rent, depreciation, repairs, repair materials, or, in other words, all expenses not included in direct labor and plater supplies, but necessary for the process of surfacing. Overhead expenses are calculated per table hour and, consequently, vary with the number of books in operation. For instance, a plant operating normally four platers with five tables (books) each, establishes the overhead expense rates on that basis and thus obtains the predetermined normal rate. If some of the tables are idle for some reason or other, the overhead expenses per table logically will be higher; for indirect charges go on, whether the plater operates full or on part time. Hence, if the normal table hour rate for five tables is fixed at 30 cents an hour, the rate for only four tables in operation increases to 40 cents or more, and the elimination of additional tables causes a proportionate increase in the overhead rate.

It does not pay to operate a plater with less than three books, and it is far better to shut down the machine until such time that the accumulation of sufficient tonnage permits operating the full number of tables.

Form No. 2 is self-explanatory; it has columns for the entry of the various items that make up the factory finishing cost. An additional plain form, for the summarization of the individual production orders at the end of a cost period, may be introduced for the purpose of showing total cost and production during that time.

The plater room foreman has to use form No. 3, the "Daily Plater Report," for each table and enter the number of reams finished by one table. These sheets will be given to the cost clerk early the following morning to check rates and quantities, make the necessary extensions and enter the divers items into Form No. 2. The sheets may then be passed to the paymaster for entry of the individual earnings into his records.

The correctness of the total number of reams can be easily verified by checking them at the completion of a production order against the trimming report, or by comparing the weight of the plated paper against the loft records in loft dried mills. There exist several methods of checking the Daily Plater Records, and practically every foreman has adopted a definite method whereby he, without much difficulty, can ascertain a correct check on the number of reams plated by the separate units.

Mills that finish sundry grades, sizes and weights in various classes of surfacing should figure the cost by production orders, or, if the paper has to be taken from stock and no production number available, by finishing orders. If a mill has just one specific grade, size and weight of paper, the adoption of the continuous or tonnage method may prove of advantage.

A method of costkeeping, as outlined, does not materially add to the duties of either costman or foreman, provided a plant has not an exceptionally large number of platers. It is an insurance against costly mistakes and its benefits are well worth while the efforts.

Pointers for the Engineer

W. F. SCHAPHORST, M. E.

Don't Buy Wet Coal

WE WERE told long ago by the Bureau of Mines that the wetting of coal is expensive. The higher the cost per ton, the greater is the cost of wetting.

I have a letter from O. P. Hood, chief mechanical engineer of the Bureau of Mines, in which he replied to my inquiry regarding percentage of moisture as follows:

"The amount of water absorbed by coal depends upon its fineness. Water adheres to surfaces, and is not drawn into the body of the piece to any great extent. Bituminous coal in lumps the size of an egg, when drenched with water, will increase in weight only a fraction of a per cent. Fine sizes, however, of both bituminous and anthracite, will hold up to 20 percent of moisture, depending upon the fineness."

When you purchase coal insist on its being dry, or at least be sure that an allowance is made for the moisture contained in it.

To make a test for moisture is not difficult. Simply take, say ten or twenty pounds of the average wet coal and pulverize it. Then heat it gently, as for example, on top of the boiler so that only the moisture will be evaporated. Do not heat it to such a degree that any of its gases will be driven off. After drying weigh again and subtract the final weight from the original wet weight. Divide the difference by the original weight and the quotient is the percentage of moisture. A moisture of 12 percent is not at all uncommon. One purchaser states that he has bought coal showing 33 percent water when delivered. In other words, at $10 per ton he was paying $3.33 for the water. If water were combustible it would not be so bad, but instead of aiding combustion water retards it. Therefore water is the cause of a double loss. Coal can have a perfectly dry appearance and still contain as much as 10 percent water.

I have before me a letter from one of the country's foremost authorities on mining matters in which he says concerning moisture in and on coal:

"In general lump coal carries less moisture than run-of-mine, while fine coal or slack or screenings carries more. I cannot offhand state how many pounds per ton there will be in coal as it comes from a mine, because the moisture content varies greatly in different seams and in different districts. In Illinois the majority of the coals will run around 10 or 12 percent natural moisture, although there are mines in this state which ship coal with only 1 percent moisture. Here at our power plant the coal (screenings) as received is wetted to about 16 percent moisture. This is not saturated but is enough to allay all dust and make the coal pack well on traveling grates. I presume the coal would hold 21 or more per cent of water. For a bituminous run-of-mine coal that would average 10 percent water, I would say that the lump would run 9 percent and the screenings 11 percent water. Please understand that these figures are only approximate."

Regarding the wetting of coal so that it will pack well on traveling grates, my suggestion is that the purchaser "wet the coal himself" rather than leave it to the coal dealer. Water as it comes from the city mains or from other sources of supply very seldom costs as much as $6 to $10 per ton.

In a small eastern city where water is higher than in most surrounding cities, it is sold to the consumer at the rate of $2.80 per 1,000 cubic feet. Even this is equivalent to a bit less than 9c per ton. Why pay $10 per ton when you can get it piped to your own boiler house for 9c per ton?

Expansion

ACCORDING to the Bureau of Standards charcoal iron expands 0.000006861 in. per degree F.; and Bessemer steel 0.000006989 in. In steam pipe lines exposed to the weather, however, the expansion is seldom if ever as great as the theoretical on account of the lower outside temperature, consequently one is safe in using the more easily remembered and slightly smaller co-efficient 0.0000067.

To compute the expansion of any given iron or steel pipe of known length use the formula $E = 0.0000067\ t\ L$, where E is the expansion in inches, t the difference in temperature in deg. F. before and after expansion, and L is the length of the pipe in inches.

Thermostatic Boiler Feed Regulation

DURING high steaming periods, it is desirable to have a lower water level in the boiler to prevent drops and slugs of water getting into the steam headers, which might do serious damage to the turbines and engines they supply. During low load periods, on the other hand, a higher water level is permissible, the difference in volume acting as a reserve heat supply available on sudden increases in load. That is how the thermostatic regulator regulates the boiler water level. It is a very simple regulator, yet much engineering skill, time and capital were consumed in its perfection, simple as it is. The wear and tear from use was reduced to a minimum. Working parts were made immune as far

as possible, to corrosion. Valve seat fittings were made easily replaceable. Besides this, the policy of placing a boiler feed regulator specifically designed and constructed to meet the conditions peculiar to each plant was adopted, thus meeting the difficult and unusual, as well as the common and ordinary conditions.

Remarkable economies have resulted in every instance where this system has been installed. Three per cent saving in coal is the average, and eight per cent is not unusual. But economies are not only to be measured in tons of coal saved in power generation, but also in increased safety and efficiency, and improved morale in the boiler house personnel through the cutting out of a lot of tedious, nerve-racking, watching and labor in connection with the boiler feed regulation.

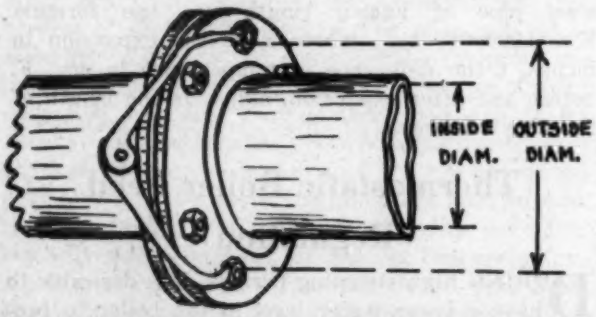
It increases the overload capacity and flexibility of a boiler plant and also increases the capacity of given boiler feed systems without necessitating the buying of larger units.

Over 98 per cent of all the big central stations in the U. S. A. now use boiler feed regulators of this type. They are specified by the leading engineers, and have been installed in the power stations in the world.

How to Measure for a Gasket

CONTRARY to the common belief, it is not necessary to take a flange apart in order to measure for a gasket. Measurements may be accurately made from the outside as indicated on the accompanying sketch.

By means of a pair of calipers take the distance from the inside of one bolt to the inside of the bolt



diametrically opposite. This gives the exact outside diameter of the gasket.

For the inside diameter, either measure the inside diameter of the pipe, as indicated, or consult a handbook giving the inside and outside diameters of standard pipe. The table will give the exact inside diameters. The inside diameter of a gasket should be the same as the inside diameter of the pipe so that no water or gas pocket will be formed.

When ordering a gasket it is usually better to give the "exact" dimensions, particularly the exact distance between bolts, so that the manufacturer can furnish a gasket of the correct size. He will probably deduct 1/32 or 1/16 of an inch. It is better to leave the deduction to the manufacturer rather than to do it oneself.

The above method is better and quicker than the one usually recommended, namely, to measure from center to center of the bolts and then subtract the diameter of the bolt. No error can be made if the above method is followed.

Selecting Valves

IN THE selection of valves, as in the selection of pipe, numerous factors must be considered. The valve, first of all, must be of the right type, gate, globe, cross, etc., and it must be suitable for the liquid or gas to be handled. Valves are commonly made of many metals, including malleable iron, cast iron, ferro-steel, brass, and brass alloys. Where water is to be handled its acidity should always be given consideration. In large and long pipe lines carrying steam, strong and tough valves are essential because of the expansion and contraction strains, possibility of water hammer, stresses caused by the weight of the pipe itself, probable misalignment on erection and the possibility of settling after erection. Also, investigate the possibility of cutting effect by the steam on the valve disk and the seat as the steam passes through. This cutting effect is particularly noticeable in certain types of reducing valves in which the disc is held close to the seat. The reducing valve that operates wide open most of the time is invariably more durable than other types. The best practice limits the size of screwed valves to 6 in. To find the limiting water pressure of a valve multiply the limiting steam pressure by 1.2 for sizes larger than 12 in., and for sizes smaller than 14 in. multiply by 1.4.

Pipe Fitting Pointers

SCREWED fittings are usually satisfactory for low pressure work and even for higher pressures where joints are carefully made. Seldom, if ever, though, should the 6 in. pipe size be exceeded with screwed fittings. Larger sizes are liable to leak because of the difficulty of screwing up tightly. Beyond 6 in. sizes, flanged fittings are always to be recommended.

After many years of confusion, manufacturers and users of fittings have finally agreed on one standard—the "American Standard." To be safe, this standard should always be specified where possible. Complete data covering the American Standard are procurable from the American Society of Mechanical Engineers or from almost any recent mechanical engineering handbook.

To determine the approximate bursting strength of a fitting in pounds per square inch, multiply the tensile strength of the metal by 6, multiply that by

the thickness of the metal in the body of the fitting in inches, divide by the internal diameter of the fitting in inches, and divide that result by 10.

In tightening bolts never slip a pipe over the wrench handle to increase leverage. Wrenches should always be short enough so that the bolt tightened will not be overstressed. A good rule to apply for determining the proper length of a wrench is to multiply the size of the bolt by 15. The result is the length of the wrench in inches. Thus for a half-inch bolt use a 7½-inch wrench, for a 1-inch bolt a 15-inch wrench, a 2-inch bolt a 30-inch wrench, etc.

Some Pipe Facts

HERE are some facts relating to pipe that the paper mill engineer may appreciate:

For steam piping the factor of safety should be at least six. The relative strength is, roughly:

	Steel	Wrought Iron
Seamless strongest	2	..
Lapwelded	1.9	1.1
Butt welded	1.5	1

Extra heavy pipe is better for bending in small sizes. It is not so liable to split and gives a rounder and better bend.

Riveted pipe is weaker than lap-welded pipe. Spiral riveted pipe averages about half as strong as lap welded. Straight riveted pipe is weaker than spiral riveted, develops more friction and should not be used for hot water, live steam, or high pressure hot liquids or gases.

Copper and brass pipe is being used more and more because of its non-corrosive properties. Brass pipe in standard iron pipe sizes is most convenient to use, although it is usually heavier, consequently more costly. The thinner tubing should not be used for high pressure work because it is not safe. Copper should not be used in high temperature work or high pressure service because it is not strong initially and it is greatly weakened by high temperatures.

For example, it is only 85 percent as strong at 360 degrees F. as at ordinary temperatures.

Gaskets

RUBBER covered canvas gaskets are usually satisfactory in water and steam pipe joints up to 50 lbs. pressure. Between 50 lbs. and 160 lbs. rubber covered wire gaskets 1/16 of an inch thick are often used. Corrugated steel gaskets give good service for superheated steam where pressures exceed 160 lbs. Corrugated steel gaskets are not necessary in water lines of either low or high pressure.

By machining the flange faces in such a manner as to support or retain the gasket, blow-out dangers are minimized, greater unit pressure is exerted upon the gasket, and possibility of leakage is lessened. The objections to these flange faces, however, such as the male and female, and tongue and groove joints, is that they cost more, are more difficult to install, and are not easily taken apart. Retained gaskets are commonly used in high pressure liquid or gas lines.

In general, the thicker the gasket the more securely it can be clamped in the joint and the less the danger of leakage.

Ring gaskets are employed in the Van Stone joint and are highly satisfactory. They are comparatively small in area, consequently a high unit pressure is exerted upon them. The disadvantage of the full-faced gasket is the lower unit pressure and the consequent possibility of leakage.

The older she gets the bigger the family.— Steam Power

If You Know

That—you can't saw wood with a hammer:

That—knocking your neighbor doesn't elevate you in the eyes of others,—and

That—the only way to get anywhere is to start and keep on going until you get there—and

That—only fools and idiots know everything and believe everything—and

That—even the angels weep when they look down and see a man who knows he has no room for improvement—and

That—there is enough success in the world to go round if you'll ONLY HELP YOURSELF—and

IF YOU KNOW AND REALIZE these facts and act accordingly, then IT'S HORSE SENSE YOU HAVE. —Anico.

Power Plant Management

Efficient Utilization of Fuel Oil

By ROBERT JUNE, M.E.

This is the fifth in a new series of articles by Robert June, the well-known authority on Power Plant Management. The articles are written from the point of view of the managing executive and deal with the dollars and cents end of Power Plant Operation and Maintenance. Succeeding articles deal with such live topics as Safe and Efficient Boiler Operation, Stoker Operation and Maintenance, What Management Should Know About Coal and Ash Handling Equipment, Steam Piping, Efficient Turbine Operation, etc. The series is timely and should prove of value to our readers.

THE fact that coal prices have shown no tendency to recede in recent years has caused power plant operators in many sections of the country, not generally regarded as natural oil burning localities, to consider and frequently to adopt oil as a boiler fuel. In this paper we will deal first with the advantages and disadvantages of fuel oil, and then take up certain factors in the efficient use of fuel oil which have not heretofore been discussed at any great length in the many articles which have appeared in the press on this subject.

Comparative Cost of Oil and Coal

The first cost of oil and coal does not tell the story of the comparative advantages of these two fuels. Many other factors, such as availability of supply, increased boiler efficiency, comparative labor costs, storage factors, etc., have to be taken into consideration. Nevertheless our starting point is the actual direct comparison in cost of B. T. U. per pound for each fuel. Fig. 1 shows the comparative first cost of fuel oil. Table I developed on a different basis takes into consideration the variation in efficiency with the two fuels, based on a constant calorific value for oil and coal.

Advantages of Oil Fuel

1—Handling costs are reduced; the boiler-room staff is cut; fewer firemen, coal passers, helpers, etc., are required, the reduction being approximately in the ratio of five to one.

2—Ease of fire control, ignition, regulation. In an exigency, such as, for instance, a failure in water supply, the oil fire can be promptly extinguished. Much time is saved in bringing up the pressure: 150 lbs. can be secured from cold water in a half-hour.

3—Since combustion is nearly perfect, much higher capacities and efficiencies obtain. Excess air is held to a minimum. The opening of furnace doors for cleaning or working of fires is dispensed with; furnace temperatures are, accordingly, almost constant.

4—Oil in storage does not lose its calorific value, as does coal. Moreover, there is little danger from spontaneous combustion.

5—The refuse from the combustion of fuel oil is insignificant, and of easy disposal. The boiler-room is free of ashes and dust. The equipment is spared

TABLE No. 1

RELATIVE VALUE OF COAL AND OIL FUEL

Gross Boiler Efficiency—with Oil Fuel	Net Boiler Efficiency* with Oil Fuel	Net Evaporation from and at 212 Degrees Fahrenheit Per Lb. of Oil	Water Evaporated from and at 212 Degrees Fahrenheit per Pound of Coal: 5	6	7	8	9	10	11	12
			POUNDS of Oil Equal to One Pound of Coal							
73	71	13.54	.3063	.4431	.5170	.5909	.6647	.7386	.8124	.8863
74	72	13.73	.3642	.4370	.5099	.5827	.6556	.7283	.8011	.8740
75	73	13.92	.3592	.4310	.5029	.5747	.6466	.7184	.7903	.8621
76	74	14.11	.3544	.4253	.4961	.5670	.6378	.7087	.7796	.8505
77	75	14.30	.3497	.4196	.4895	.5594	.6294	.6993	.7692	.8392
78	76	14.49	.3451	.4141	.4831	.5521	.6211	.6901	.7591	.8281
79	77	14.68	.3406	.4087	.4768	.5450	.6131	.6812	.7493	.8174
80	78	14.87	.3363	.4035	.4708	.5380	.6053	.6725	.7398	.8070
81	79	15.06	.3320	.3984	.4648	.5312	.5976	.6640	.7304	.7968
82	80	15.25	.3279	.3934	.4590	.5246	.5902	.6557	.7213	.7869
83	81	15.44	.3238	.3886	.4534	.5181	.5829	.6447	.7125	.7772
Net Evaporation from and at 212 Degrees Fahrenheit per Barrel of Oil			Barrels of Oil Equal to One Ton of Coal.							
73	71	4549	2.198	2.638	3.077	3.516	3.955	4.395	4.835	5.275
74	72	4613	2.168	2.601	3.035	3.468	3.902	4.335	4.769	5.202
75	73	4677	2.138	2.565	2.993	3.420	3.848	4.275	4.703	5.131
76	74	4741	2.110	2.532	2.954	3.376	3.798	4.220	4.642	5.063
77	75	4807	2.082	2.498	2.914	3.330	3.746	4.162	4.578	4.994
78	76	4869	2.054	2.465	2.876	3.286	3.697	4.108	4.518	4.929
79	77	4932	2.027	2.433	2.838	3.243	3.649	4.054	4.460	4.865
80	78	4996	2.002	2.402	2.802	3.202	3.602	4.003	4.403	4.803
81	79	5060	1.976	2.371	2.767	3.162	3.557	3.952	4.348	4.743
82	80	5124	1.952	2.342	2.732	3.122	3.513	3.903	4.293	4.683
83	81	5187	1.927	2.313	2.699	3.085	3.470	3.856	4.241	4.627

*Net efficiency = gross efficiency less 2 per cent for steam used in atomizing oil.
Heat value of oil = 18500 B. t. u.
One ton of coal weighs 2000 pounds. One barrel of oil weighs 336 pounds. One gallon of oil weighs 8 pounds.

the deleterious effects of such abrasives. Annoyance and damage to surrounding property is minimized.

6—Smoke can be practically eliminated.

Disadvantages of Oil Fuel

1—Fire Hazard: Apparatus using oil for fuel, however safeguarded, introduces a distinct hazard which should be recognized.

2—Storage: Oil storage not only offers more hazards than coal storage, but it frequently calls for the use of a great deal more space. The table of storage capacities permissible under laws of National Board of Fire Underwriters, shows that unlimited

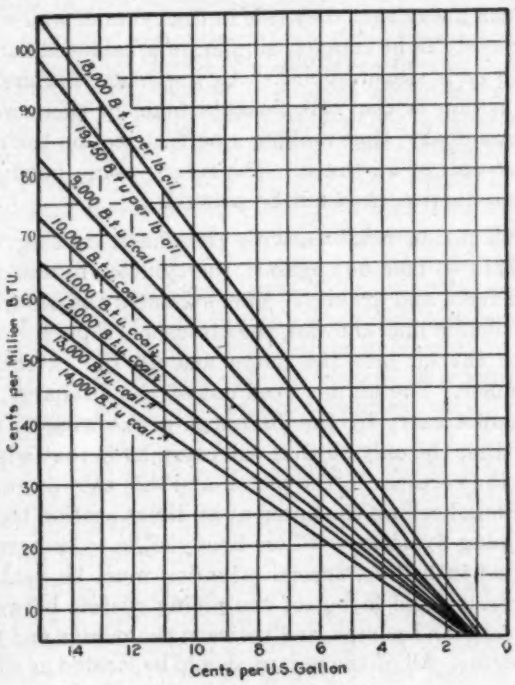


FIG. 1. COMPARATIVE WORTH OF COAL AND OIL
Courtesy of Power

capacity may be stored at a minimum of thirty (30) feet from the nearest building line. The laws deal at length with the thickness and size of vent and fill pipes, cover boxes, indicators, filters, etc., making a complicated and expensive storage installation.

3—Reliability of Supply: Fuel oil must be transported in special cars and special delivery wagons of which there are a limited number available at any one time. Coal shipments so far exceed the shipments of oil that the transportation of coal is a chief source of revenue to the railroads. If coal cars should be delayed in transit, the roads would soon become blocked and demoralize the whole system of freight movement. Production of bituminous coal has always been adequate, the coal must be moved, consequently the supply has always proved reliable. Coal hauling by local teamsters is more flexible than depending upon one company for delivery of fuel in a tank wagon.

4—Price Stability: The history of the oil market shows wide variation in price, ranging from 2c per gallon up to as high as 7.5c. Present quotations are still subject to fluctuation, and it is doubtful whether a contract could be made to guarantee a fixed reasonable price and delivery over a satisfactory period of time. The coal market, insofar as steam sizes go, has been very much more stable than the oil market. Moreover, coal prices today are regarded as near the top, and any tendency to boost them seriously would meet with tremendous resistance all over the country. There is no such public sentiment against increases in oil prices as there is against increases in coal prices.

5—First Cost of Equipment: A modern fuel oil plant consisting of duplicate storage tanks, oil heaters, pumps, etc., and reliable workmanship for its installation is estimated to cost approximately thirty dollars per horsepower. Up to date, mechanical stoker equipment consisting of complete stokers, which will ordinarily outlast the life of an oil plant, auxiliary apparatus including modern ash removal system and labor for installing should not exceed $18.00 per horsepower, a saving of nearly 40 per cent over a fuel oil plant.

6—Boiler and furnace maintenance costs will be higher with oil, unless they are especially constructed for burning it. In localities where feed water tends to form considerable quantities of scale, the repair costs are likely to be much increased by reason of the intense temperature developed in the furnace.

Handling in Bulk

The decision as to whether to use fuel oil will depend entirely upon local conditions. The above points are suggestive of the factors which must be taken into consideration in considering use of oil in any given plant. The final decision will be made upon local conditions. Let us assume that oil is to be used. We have then the problem of handling it in bulk quantities. This presents a problem which has not been generally discussed.

Let us assume that we must take care of an average of one or more tank cars within each 24 hours period. Where gravity discharge is possible, it is desirable to place 10-inch pipes in a vertical position in the center of the rails and discharge the oil through these pipes into the storage tank. If several cars are customarily received at the plant at the same time, it may be well to put in several of these pipes, in which event they should be arranged with 43-foot centers, as this is the length of the most commonly used tank cars. Threaded, or flanged caps, preferably threaded, should be provided for the 10-inch pipes, when not in use. The 4-inch discharge pipes of the car can be located directly over the 10-inch pipe with the result that when the car is properly heated,

its contents may be discharged in one-half to three-quarters of an hour.

The 10-inch line should have a gate valve at the entrance to the tank or at the entrance of each tank, if branches are provided to more than one tank. As a matter of safety and also to comply with the insurance rules of some states, the filling pipe should enter the tank near the bottom, thus providing an oil seal

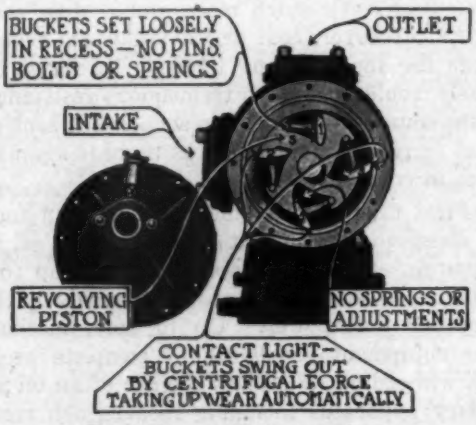

BUCKETS SET LOOSELY IN RECESS—NO PINS, BOLTS OR SPRINGS
OUTLET
INTAKE
REVOLVING PISTON
NO SPRINGS OR ADJUSTMENTS
CONTACT LIGHT—BUCKETS SWING OUT BY CENTRIFUGAL FORCE TAKING UP WEAR AUTOMATICALLY

Fig 2—Cross section rotary pump

which will prevent the possibility of any gas within the tank being ignited by means of flame carried through the 10-inch line.

It is, of course, necessary to heat heavy oil whenever it is moved. This means that storage tanks may be equipped with heating coils. Where tanks are located above the ground, the area of the heating coils will be largely determined by the climate. Where tanks are buried, approximately 35 feet of ¾-inch steam pipe should be provided for each 10,000 gallons capacity.

It is quite a common mistake to bring oils to too high temperatures when endeavoring to move from storage. This should be avoided because it wastes steam and therefore fuel, unnecessarily, and it does not make oil any easier to handle above a certain point. Should there be any water in the tank, as frequently happens, it may produce steam bubbles in the oil and cause foaming.

A good average safe temperature for handling oil out of storage is 125 degrees F. In laying out steam lines, provision should be made for a ¾-inch line to the tank car.

Best Pump for Oil Service.—Rotary pumps are in use by thousands for handling oil and their popularity is well deserved. The rotary pump has so frequently demonstrated its advantages over the piston pump for this same service that it is hardly necessary to describe at length the different actions of these two principles. Suffice to say that the rotary pump will handle a larger volume of liquid with less power than the piston pump. This is so because the action of the rotary pump is continuous.

When once started there is no stop or hesitation in the flow of liquid, whereas in reciprocating pumps, when the piston has reached the end of the stroke, it stops and with it stops the flow of liquid. It is a well established fact that it takes more power to intermittently start the movement of anything than it does to keep it moving when once started.

The three advantages of rotary action are: 1—Continuous flow with greater pumping volume; 2—Saving in power, with consequent reduced cost of operation; 3—Less slippage.

A typical rotary pump is illustrated in Fig 2. It will be noted that the buckets are hung in the roter in such a way that they ride in the cylinder wall with extremely light contact, similar to a balanced flange valve on a steam engine. An important feature of the action is that the buckets take up their wear automatically, thus making a perfect seat on the cylinder wall at all times. The rotary pump having a piston suction need not be primed.

The piston revolves with the shaft, causing the buckets to hold out against the cylinder by centrifugal force and gravity. This exhausts the air from the suction line, allowing the atmospheric pressure to force the oil into the pump and fill the extension chamber. The oil is forced out of the discharge, as it cannot carry by the discharge port, owing to the fact that the only oil that will carry by is that which fills the recesses in the piston and this acts as an oil packing, keeping the pump at all times suction tight.

Piping Systems.—Where heavy oil is to be burned as fuel in boilers, special attention must be paid to the design and layout of the piping system between the tank and pumps, and between the pumps and the burners. All of the pumps should be located as close

Fig. 3—Pumping plant, Standard Oil Co. of Ohio. All piping 4-inch. By-pass on every pump

to the tank, and at the same time as close to the floor as possible, in order to reduce friction and suction lifts.

The intake line should be at least half an inch larger than the pump suction. The use of elbows should be avoided, long sweep bends being used in their places. Where the intake pipe lies along level ground for some distance, it should be installed with a slope upwards of about one foot in one hundred, toward the pump. Care should be taken to see that pipes are placed either in dry, well drained ground, or in an equally well drained wood or concrete trenches. In the northern states, piping subject to frost should be insulated. Discharge pipes from pump to burner should also be insulated.

It is quite frequently the practice to place a small live steam line inside the discharge line to supplement the oil heater. In such cases, expansion at the point where the small line is introduced is taken care of by provision of stuffing boxes. By putting in this small steam line, it is possible to heat the oil in the discharge line when starting up a cold installation. This is an important point as it greatly facilitates handling the heavy oil. Another piping detail which will greatly facilitate handling is to run a circulating line from the far end of the discharge heater back to the suction tank. This makes it possible to circulate oil entirely through the system, in advance of firing the boilers—quite an advantage with heavy oils.

For piping of this sort, standard weight pipe and fittings can be used. However, real care should be exercised in selecting the valves, as cheap valves have a great tendency to leak.

In putting in piping for oil, joints should be made up with a compound not affected by oil. For this purpose a mixture of litharge and glycerine is frequently used. However, to secure best results, this combination should be mixed in very small quantities and used as rapidly as mixed, for the reason that it sets very quickly and is, of course, of little value if the thread is not screwed on and the joint made before the compound has hardened.

Pointers on Efficient Operation

Oil should not be heated above its flash point in any part of the system except the burner. Such preheating will cause oil to become carbonized and to clog up the piping system, resulting in unsteady burning and the need for additional pressure to force oil through the clogged pipes.

When using a steam atomizing burner see that only enough steam is turned on to give a soft clear flame. Too much steam is not only wasteful, but cools the flame to a certain extent and develops the possibility of blow-torch action, so damaging to brick work. A white flame indicates excessive steam. Regulate the steam for each burner at its respective steam valve. Constant attention should be given this.

If the boiler is provided with a superheater see that superheated steam is used in preference to saturated steam as an atomizing agent for the oil.

Oil pressure should not exceed the pressure of the atomizing steam or air. If this occurs there is danger that the oil will lodge on the brick work at the back of the combustion chamber before combustion is complete. In general the steam or air pressure should be 5 pounds greater than that of the oil.

Fig. 4—Pumping plant, Nicholas Oil Co., Omaha, Neb. Six pumps handle kerosene, gasoline and four grades of lubricating oil. All pumps driven from one motor. Clutches and gears allow operation of any or all units

When a boiler is down for repairs, particularly furnace repairs, take out the burner before any work is done inside. Damage to tips is always possible if the furnace is being worked upon.

The Man Wrapped Up in Himself

WALKING along the other day, I happened to glance upon a bulletin board and read this epigram: "A man wrapped up in himself makes a very small package."

Self-absorption undoubtedly leads to contraction. Only as we lose thought of ourselves and take thought of others do our dimensions grow. How wonderful it is to associate with others, to realize the other fellow's viewpoint, to work with him even though our judgment may be a little rebellious!

To feel as high as the stars and as broad as the universe is a happy sensation that we cannot enjoy except as we give up self-absorption and realize that there are others beside ourselves in the world. A little wrenching may be needed to break the old moorings and cast us into entirely new currents, but it will give great satisfaction to realize that there are other people bigger than ourselves, that there are spheres other than our own.

Introspection is useful only as it may lead us to appraise our needs and place us where the best we have is at the service of our neighbors, our fellowmen.

J. H. TREGOE.

Editorial Comment

By WILLIAM SIBLEY

A Dream—(?)

Time: 11:45 p. m. One night last week.
Place: Slumped deep in the Morris chair.
Character: Myself.

THE newspaper sprawled over the floor. A thin, transparent thread of blue smoke ascended from the ash tray. Legs outstretched—arms at ease—eyes half closed—shoulders buried deep in the overstuffed. Thus I dreamed my dream.

First I visited our 68th Congress. I saw them slashing taxes—(a wonderful bolster to any administration). I saw the globe-trotting senators wasting days and weeks in futile and foolish discussion of the European situation—telling of what they had seen (as they saw it) and recommending radical relief measures. I saw needed legislation delayed because thereof. Worse, I saw the soldier's bonus question lift its head, high and mighty, above the capitol dome.

Discussed — considered — revamped — passed — signed—I saw it become a law—that one fell swoop upon Uncle Sam's pocket-book, the Treasury. I saw the tax-cut sewed up hurriedly, the wound wrapped with a thousand miles of red tape. I saw taxes mount to over ten billions of dollars annually. (In 1923 we paid $7,061,000,000; 1913 a total of $2,194,000,000; 1903 only $1,382,000,000.) I saw this ten billion tax levy a serious obstacle to industrial activity—a stem to the country's progress. I saw the billions dispersed—the gladness on the part of the recipients—the true relief afforded the few. And then—I saw 95 percent of the ex-soldiers no better off at the end of the first year.

And then—as I sat there—too frightened to move—there came another vision. A dream sequel to the one just passed.

I saw the soldier's bonus swept aside. I saw it torn asunder—mutilated—killed forever. In place thereof, I saw a law passed. A law that gave every ex-soldier one year's tax exemption (municipal, state and federal) for each month of military service.

For those who served locally or domestically, say for 120 days, an exemption from taxation for a period of four years was given. To him who served two years, overseas, perhaps, was given a tax exemption for twenty-four years.

Under this law I saw the burden of obligation to the government spread over a long term of years. I saw the value to the men remain in evidence year after year. I saw each ex-soldier, at income tax time, loose a gratified laugh at the fellow who stayed home and reaped war-time wages but who now must "answer the call." I saw the compensation to each soldier as valuable to himself as he himself made it. I saw the compensation on the exact plane with the recipient. I saw gratitude to the government, openly expressed, for a period of from six to thirty years.

But, ah—it was only a dream.

The Black Sheep

A TYPICAL "roughneck." Tall, muscular, angular. Hard featured—hard fisted. Long days and weary nights, he and a few companions manned his oil rig, sinking their hole deeper—ever deeper.

And fight—? At the drop of a hat! Veteran of many combats.

Every payday saw him on his periodic spree. To be sprawled unconscious on the sidewalk, or huddled dejectedly in the corner of a cell was his fortnightly experience.

His brothers were holders of high offices. Wealthy and well respected. One an attorney—the other a minister. His sister was a member of the elite, frequently mentioned in the society columns. He was the black sheep of the flock—the worthless, ne'er-do-well. He was the sole support of an aged mother.

Oil vs. Coal

STIRRED by the uncertainty of supply and the ever rising price of anthracite, eastern users of coal are being urged to burn oil. Mayors of New England towns have advocated the boycott.

Given impetus by high freight tariffs and soaring prices on coal, oil burner manufacturers are exploiting their wares ever more keenly.

Some dealers have lost business to this "new" source of heat producer. Now and then we hear of an operator failing to dispose of his smaller grades because of the introduction of an oil burner.

Thirty years ago Chicago had its world's fair. It was the original plan to heat it with coal. Sensing the value of the possible advertising, the operator who had been successful in the bidding painted a number of gondola cars white, across the side of which he lettered: "Chicago World's Fair supplied with ——— Coal by ———."

However, plans were changed over night. Oil was accepted and used instead. And the coal industry threw up its hands and cried: "Oil cooked our goose. In five years we'll all be out of business."

Only the other day, I happened on an editorial in

—— on Timely Subjects

a coal journal published in February, 1904. The writer seemed much perturbed by the inroads oil was making in the coal business. He suggested rather stringent relief measures. And that was twenty years ago.

If all of the oil produced in the world today were consumed for fuel purposes, it would not equal 20 percent of the coal production.

Price of Unpreparedness

IT IS interesting to know that the Central Powers mobilized 22,850,000 men and inflicted 22,090,000 casualties on the troops of the Allied forces. Also, that the Allied and Associated Powers mobilized 42,189,444 men and inflicted 15,405,000 casualties upon the Central Powers.

In the one case, nearly one casualty for every man mobilized. On the other side, one casualty for almost three men. This is the price of unpreparedness.

The figures are quoted from a talk by Benedict Crowell, president of the Army Ordnance Association.

Respect for Law

ABRAHAM LINCOLN once said: "At what point shall we expect the approach of danger? By what means shall we fortify against it? Shall we expect some trans-Atlantic giant to step the ocean and crush us at a blow? Never!

"At what point, then, is the approach of danger to be expected? I answer if it ever comes, if it ever reaches us, it must spring up amongst us; it cannot come from abroad. If destruction be our lot, we must ourselves be its author and finisher. As a nation of free men we must live through all time or die by suicide.

"I hope I am over-wary; but if I am not there is even now something of evil omen among us. I mean the increasing disregard for law which pervades the country—the growing disposition to substitute wild and furious passions in lieu of sober judgment of courts, and the worse than savage mobs for the executive ministers of justice.

"The answer is simple.

"Let every American, every lover of liberty, every well-wisher of his posterity, swear by the blood of the Revolution never to violate in the least particular the laws of the country, and never to tolerate their violation by others.

"Let reverence for the laws be breathed by every American mother to the lisping babe that prattles on her lap; let it be taught in the schools, in seminaries and in colleges; let it be written in primers, in spelling books and in almanacs; let it be preached from the pulpits, proclaimed in legislative halls and enforced in courts of justice. And, in short, let it become the political religion of the nation; and let the old and the young, the rich and the poor, the grave and the gay, of all sexes and tongues and colors and conditions sacrifice unceasingly upon its altar."

There are those who laugh at prohibition laws. The libertine laughs at the marriage laws. The I. W. W. laughs at property laws. Take care—else your sons and daughters laugh at all laws!

Bowing to Lady Nicotine

WHEN the writer was but a youngster—somewhere in the tender but know-it-all "teens", his father (a most considerate and upright man) caught him industriously pulling a pipe in the cool privacy of the shady side of the barn.

My father, then and there, did something the writer shall never forget.

With sorrow plainly written across his face, he laid his calloused and work-roughened hand on my shoulder, and said: "My boy—smoking is no crime. A great many good and distinguished men smoke. No doubt the President of the United States smokes a pipe. But I'll tell you—however great and good they are, those same men would be just a little bit better if they didn't smoke.

"With boys like you, however, there is one thing about smoking that is really bad. It is the tendency to make boys liars and sneaks until such time as they deem it wise to tell the world they are smoking. Now if you really want to smoke—do so. But don't lie to your mother or to me about it and don't be a behind-the-barn sneak. Come out in the open. If you are wrong and there is 'medicine to take'—take it like a man—not like a sneak."

All of which recurred to us today as we read the figures for 1923: 60 billions of cigarettes—over 725 billion pounds of tobacco consumed. And this as against 325 billion pounds in 1900—with less than 2 billions of cigarettes.

For fear that we will be classed with other "reformers" (due to the inference in the above paragraph) however, we hasten to add our conviction that legislation restricting the use of tobacco will never be enacted until such use impels a man to deprive his children of the necessities of life and to beat his wife.

Economic Prospects of 1924

By HERBERT HOOVER
Secretary of Commerce

THE important thing in formulating any judgment as to the economic future is an understanding of our present position and of the forces that are in motion for and against economic progress. The following summary is based on the annual review by the department representatives throughout the world.

The economic outlook for our own country for the next year is bright. In general the world situation is hopeful. The general spirit of prudence, the absence of speculation, complete employment, high production, and the great financial strength and stability of the important states in the Western Hemisphere, together with the promise of the early conference for systematic consideration of constructive solution of the world's greatest economic menace—Franco-German relations—all create a hopeful foundation on which the New Year may build.

An economic weather chart of the world would show three distinct areas.

First, the Western Hemisphere, Asia, Australia and Africa, which have made distinct economic progress during the past year, achieving a high degree of economic recovery.

Second, Russia, the Baltic, the Balkan States, the Near East, Italy and Spain, which are still struggling with after-war political, social, currency, debt, and budget problems but yet show undoubted progress in the restoration of commerce and industry.

Third, an area of economic depression resulting from the occupation of the Ruhr and the collapse in Germany. While most acute in that country, it radiates its depressing influences strongly over Poland, Czechoslovakia, Switzerland, Hungary, Scandinavia, Holland, and Great Britain. France can well be placed in this group because the failure to secure reparations has contributed to an unbalanced budget and the resulting indirect inflation. This has concealed the true situation and has given an artificial and forced draught to the industrial activity. The other countries of the group are suffering from a distressing increase of unemployment.

Whole World Affected by German Situation

The German collapse has in less degree affected every other part of the world. The decreased consuming power of Germany and of the states most affected has contributed to the low price levels of food products in the United States and other food exporting countries. The decrease in her steel and coal production at first gave some stimulus to the production of other countries, but this is now offset by decreased buying power of the depressed area for other commodites. One other effect of importance has been the undoubted substantial flight of capital from many of the states in this areas of depression to the United States, resulting in further excessive accumulation of gold here. The economic world has not yet felt the full impact of the occupation of the Ruhr. Were it not for the hope inspired by the initiation of negotiations for settlement of the Germany problem, the situation would be most unpromising for the future.

Even with settlement accomplished there will arise considerable problems in readjustment of trade through re-entry of German coal and steel into the markets, and through the possible (and to be hoped) return of capital which has sought refuge in the United States from many parts of Europe. During the whole year passed, the events of the depression area have at least served to inspire caution in the rest of the world and has contributed to the absence of speculation and, therefore, to their fundamental stability. If it be possible to reconstruct Germany's finances during the forthcoming year and to secure such assistance to France as will enable the stabilization of the franc, the world will have entered into a period of great hope and much promise of prosperity. Full consummation cannot, of course, be accomplished without a large measure of disarmament in Europe, for the armies today maintained by 170 million people there are upon a scale which if repeated in the Western Hemisphere, would mean 3,000,000 men under arms—a strain that would have made recuperation almost impossible on this side of the Atlantic, even with the economic strength which this hemisphere possesses.

Russia is slowly making progress with the inch by inch abandonment of communism and socialism. War has ceased in the Near East. Greece and Turkey are turned toward progress. The eastern states of Europe are sensibly approaching sound projects for stabilization of budgets and currency. China is still disturbed politically, but her commerce is maintained despite of it. The Japanese disaster has had less effect upon her economic stability than many anticipated and has furnished new proof of the great strength and courage of that country. Latin-America is steadily increasing in productivity but currency conditions in some instances leave much to be desired. Except in Mexico there has been a steady increase in political and social stability.

Our own country has shown a more freedom from depressing European economic influences than most others. The explanation lies in the fact that although our exports are of profound importance, less than six per cent of our total productivity is exported and of this only about one-half to Europe. The proportion of different products exported to Europe of course varies and European conditions, therefore, have a fluctuating influence upon different industries. As less than one per cent of our manufactured products find their market in Europe, the direct effect upon these industries is more negligible than upon certain agricultural products which are much more dependent upon European consumption, such as wheat and pork products, and we endure both economic and political reactions at home from this latter fact.

In 1923 the United States have witnessed the highest total productivity and movement of commodities since the war, with full employment, high real wages, greatly increased savings, large additions to home building, and the largest increase in railway equipment since the war. The whole has been accompanied by a remarkable absence of speculation, consequent over-accumulation of consumable goods, or dangerous expansion of credit. As we are not in a boom we can expect freedom from a slump. Some secondary interrogations can be raised as to the effect of the expansion of installment buying of consumable goods, the acute suffering in the Northwest agricultural areas, the increase on stocks of some commodities, and decrease on some advance orders. These items are small compared to the whole industrial fabric. Taking the country as a whole we never in history have enjoyed a higher standard of living and comfort, nor so great a degree of commercial and industrial efficiency as today or so wide an understanding of the forces which control the ebb and flow of business. As severe as the situation is in the worst of the agricultural states, yet the disparity between agricultural prices as a whole and industrial commodities is gradually lessening and the economic balance is tending to right itself.

U. S. Made Progress in 1923

A more detailed examination of our own situation based upon the first eleven months, and some later data, indicates that our foreign trade will show about $4,100,000,000 in exports and about $3,800,000,000 in imports—an increase of 7 per cent in the former and 20 per cent in the latter over 1922. The merchandise balance will be about $300,000,000 in our favor. Net gold and silver imports will be about $260,000,000 or on the face of these figures almost a full liquidation of the trade balance. On the other hand, our very large net expenditure upon tourists, emigrant remittances, and other current invisible items have been apparently liquidated by the very considerable flight of capital from Europe. Our publicly issued loans to foreign countries and enterprises have been about $300,000,000 net for the year, as compared to over $600,000,000 last year.

Our manufactured production taken together will show about 10 per cent higher than 1920 and 15 per cent higher than 1922. The 1923 production of coal and coke shows a great increase, but the strike in 1922 prevents any useful comparison with last year. Production for this year increased over 1922 by about 40 per cent in iron and steel, about 50 per cent in copper, about 60 per cent in automobiles, about 15 per cent in rubber tires, about 10 per cent in lumber, about 20 per cent in cement, about 20 per cent in sanitary ware and about 10 per cent in leather. Textiles were about the same as the year before.

In the agricultural products cotton production increased about 3 per cent; the total bushels of cereals show an increase

of about 3 per cent; pork production about 20 per cent, beef about 5 per cent—with a slight increase in dairy produce.

In construction work the large additions to our railway equipment have enabled the railways to fully handle the traffic for the first time since the war, and marks a great achievement. In building there has been about the same floor space constructed, but there has been a great shift from public construction to make way for private work, as indicated by the decline of over 20 per cent in public building construction, and an increase of about 15 per cent in residential buildings compared to 1922. This shift from public to private construction is also indicated by the fact that concrete road contracts declined about 16 per cent while the output of cement, however, increased as above.

In transportation, car loadings were increased by about 15 per cent. Cargo traffic through the Panama Canal doubled, it increased 40 per cent through Sault Ste. Marie and 30 per cent through the Erie Canal. The overseas tonnage was about the same.

Consumption is indicated by the increase in sales of mail order houses by about 30 per cent, in chain stores 18 per cent and department stores about 10 per cent over 1922. Postal receipts were 10 per cent greater than 1922.

The stocks of goods generally at the end of this year are somewhat higher than at the beginning of the year and unfilled orders for steel are lower, as are orders for railway equipment. But the large employment bids fair for large continued consumption of goods.

Price levels maintained comparative stability. Wholesale average prices of all commodities declined about 3 per cent for the year and stand 52 per cent above 1913. Average price for ground crops increased 15 per cent, while live stock declined about 7 per cent. Retail food prices increased during the year about 4 per cent and the Labor Department Cost of Living Index would show an increase of about 4 per cent.

The national debt has been reduced about one billion dollars during the year; bank debits to individual accounts remained about the same in New York but increased about 12 per cent in the rest of the country. The money in circulation apparently increased about 6 per cent. Member banks show an increase of about 6 per cent in loans and discounts. The reserve ratio is about the same as a year ago, that is about 76 per cent. Savings increased about 10 per cent and life insurance sales about 22 per cent. The financial items, therefore, show a general parallel with increased production without inflation.

Summary

In summary, the world situation continues under the European cloud of the reparations dispute, unbalanced budgets, unstable currencies, and the political uncertainties of armies in the old allied states greater than prewar. Yet the realization of the necessity to constructive solution of reparations, the constructive aid to Austria and Hungary, and the projects for budget reorganization in other countries, all give hope that we have at last taken a turning.

Our own country has exhibited extraordinary strength and progress. The basis of healthy business activity lies in balanced budgets, stable currency, high production accompanied by proportionate consumption and savings with an absence of speculation, extravagance, and inflation. These things we have in the United States. We have even more in the hope of decreasing taxes. The odds are favorable to 1924.

Selection of Materials for Paper Mill Roofs

JOHN A. KAGERHUBER
Mechanical and Consulting Engineer

DECAY of structural timber is receiving considerable attention at present. Decay in roof timber is found mostly in buildings where a lot of moisture is always present in the air, this being particularly the case in pulp and paper mills. Practically all the mills have been using wood in building their roofs, until a few years ago when other materials came on the market for this purpose, and it has been found that only a small number of mills have been able to avoid decay of their roofs by proper ventilation of their rooms. The average life of a wooden roof in a paper mill is about ten years; some mills have been lucky in having their roofs last a few years longer, while others have had to replace them in seven or eight years.

It seems that little depends on the kind of wood used in building the roof. Roofs made of southern pine, white pine, spruce, etc., can be found in just as bad condition as those made of woods considered less suitable for roof building. Various types of roofs are in use, but none of them seem to be very practical on account of decay developing in the timber.

The following types of roofs have been found decayed: 1-inch boards on rafters, 2- to 6-inch planks, those sheathed without air space and also those laid in such a way as to form an air space of 1 to 6 inches. The lasting quality has not been improved by using straight boards or tongued and grooved lumber. The trouble with most of these roofs is that moisture enters the space between the planks and works through to the upper side of the roof, where decay begins.

Most roofs, which give trouble with decay, will always show moisture condensation on the under side of the roof during cold weather. Generally, when a roof is troubled with moisture condensation, it has already started to decay, and a roof that has started to decay will give trouble with condensation. If wood has to be used for roofs, there is only one way to make it satisfactory and that is to give the lumber a preservative treatment prior to using or applying the timber to the roof. Such treatment should be, or consist of, a poisonous substance, which will kill any fungous plant actually in the wood and stops their further development. The wood can be treated with a brush, although this is not very satisfactory because surface treatment is not sufficient to kill any fungus which may be already on the inside of the wood. The best way in treating the wood is by applying the preservative under pressure, whereby the wood is impregnated and all chances of decay is removed. Even though roofs are built with timber thus treated, it would not solve the problem, because the moisture condensation is still present. Further, creosote, which is the substance used for treatment in most cases, leaves a black and oily surface, which is not very attractive.

Condensation, or sweating of the roofs, which is found so often in mills is generally traceable to poor ventilation. Condensation forms on the under side of the roof and collects in drops, which in turn fall and cause a lot of damage below, especially to the felts and finished paper which is stored in the different parts of the mill. In some mills this is not entirely due to poor ventilation, but to condensation which forms between the planks of the roof and the roofing paper. This collects in drops and unites with the moisture on the under side of the roof.

The air in most paper mills is very moist. Part of the moisture in the air will be condensed into water as soon as the air has been cooled to a temperature below its dew point. This air is so moist that a drop in temperature of just a few degrees is enough to bring about a change. Large volumes of moist air leave the paper machine at a high temperature. This air being warmer than the surrounding air, it at once rises to the roof, unless it is caught by fans and carried out of the mill. In cold weather the under side of the roof is much cooler than the balance of the air in the room, so that when the moist air strikes it, it is at once cooled below its dew point and when this happens some of this moisture is deposited on the roof and shortly collects into drops which fall.

Very often there are spaces between the planks and the roofing paper. In cold weather this space is much colder than the air in the room, so when moist air gets into it, it will at once condense. A permanent moist condition is created therefore, which is splendid for fungi growth. The top surface therefore starts to decay and as decay progresses it works through the planks. Decay is generally more noticeable where the planks come in contact with steel purlines, etc., as these points are so much cooler than other places and decay is so much more pronounced. In the most favored cases only a few years are required for the timber to rot to such

an extent to make it necessary to replace the roof.

In mills where the extreme volume of moisture from the machines is removed to the outside, fresh air has to be brought in. This is done by taking the fresh outdoor air into a room filled with heating coils where it is heated to 60 or 70 degrees. A fan on the inside of this room will force this heated fresh air into large pipes, which in turn convey it into the mill, preferably under the roof. If the roof happens to be flat these ducts should be run along the side walls the whole length of the mill, with enough opening so that the dry heated fresh air will reach all parts of the roof. Only in this way will it be possible to get a good heating effect with a

Figure 1

minimum of heat supplied. As the moist air is removed from under the hoods of the machines the new and fresh air will replace that removed with the steam, and therefore an ever-changing dry air is found near the roof and only in this way can the roof be kept dry and condensation and decay prevented. However, it is advisable to let expert ventilating engineers lay out the ventilating system in each individual

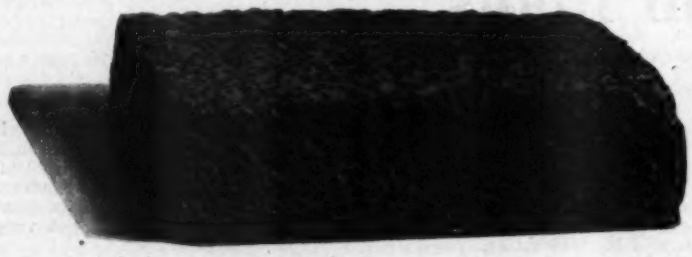


Figure 2—Sample of Porete

case, as there are many other items to consider besides the shape of the roof.

Those who do not have to contend with moisture in buildings seldom realize the amount of work and operating expense which they incur by thoughtless roof construction. A 4-inch concrete slab makes a first-class fireproof and waterproof roof, but it has such poor insulating qualites and properties that it is excedingly difficult to keep dry; further, solid concrete roofs are heavy and require heavy steel trusses and also expensive work to pour the concrete in place. It can be done if the first cost of the system and operating expense are ignored. It is much more economical to provide a 4-inch air space on top and 2 inches of wood as an insulation with regular roofing material on top. Such roofs were put on in various mills and in conjunction with proper ventilating systems they have been a success in weather as much as 20 degrees below zero, but, of course, this type of roof is not fireproof.

Another construction coming into use is a 4-inch reinforced gypsum slab with the regular roofing material on top. The gypsum has only half the weight of concrete and requires no further insulation. It is fireproof and if the ventilating system is the proper kind it is fully equal to the concrete roof.

If the owner cannot afford fireproof roofs, then the roofs should be at least 3 inches thick, but if the roof has not the proper insulation it must be offset by increased cost of ventilating systems to keep the roof dry and this is a continual expense of operation.

The writer was confronted with the design and construction of a large addition to a paper mill and when it came to the roof, a quarter-pitch roof with a monitor top was decided upon as illustrated. (Figure 1).

Finally the material for the roof had to be selected, and the writer hesitated for some time, bearing in mind his experience with various materials heretofore used in new roofing which had been put on the market. A new material called Porete was investigated, and being satisfied with the tests received and from references of users, this material was decided to be used. This material proved to be so satisfactory that the writer has gathered more information about this material, which he wishes to pass along to the paper industry in general.

For some time the Porete Manufacturing Company, of Newark, N. J., has been manufacturing for construction purposes, concrete slabs containing so many air cells that their weight is only about one-third that of the corresponding solid slabs. The necessity for chemical control in this case arises from the method that has been devised for making the concrete porous. A material that is solid at ordinary temperatures but melts easily in hot water, is formed into round pellets about one-sixteenth to one-eighth of an inch in diameter by allowing the liquid material to flow through a perforated plate into a tank of cold water. The pellets are discharged upon a screen to drain and when the requisite quantity has been prepared the screen is dumped into a mixer below. Cement and sand are added so that the final proportions are three parts of cement, one of sand and seven of pellets. After mixing thoroughly with a measured amount of water, the concrete is dumped into a hopper provided with a measuring device which delivers a uniform volume of concrete to the forms. These are of steel, so constructed that they may be taken apart to facilitate removal of the completed slabs. Before filling, a piece of expanded metal reinforcing is placed in the form and supported evenly about ¼" above the bottom plate. After the concerte has been leveled off with a hand trowel the filled forms are placed in racks, where they remain until evening. In order to regulate the setting process, the racks are then placed in a tank of warm water over night. An electric hoist mounted as a traveling crane is used in handling the racks.

By morning the concrete has set sufficiently so that the slabs may be removed from the forms, which are then cleaned and made ready for further use. In order to render the slabs porous it is, of course, necessary to get rid of the pellet material, and since this is relatively much more valuable than the other constituents of the concrete, it is desirable to recover it as completely as possible. The combined step of removal and recovery is thus a very important part of the manufacturing process. The slabs are sealed in an oven which can be heated externally by a coal fire and which is also provided with connections from steam to the interior of the oven. As the slabs warm up the pellet material melts and runs out through an opening in the bottom of the oven into a sump. The remaining pellet material is removed by introducing superheated steam, which carries the vapor through an outlet in the top of the oven to a water-cooled condenser. By means of an automatic temperature regulator it is possible so to condense this mixture of steam and vapor, that the pellet material remains liquid and collects with the material already in the sump. The recovered material is pumped from the sump to the pellet-forming machine, thus completing the cycle.

The finished slabs are 24x32x1⅛ inches thick and weigh about 30 lbs., including the expanded metal, while a solid

Figure 3

slab of the same dimensions and composition would weigh about 75 lbs. This is equivalent to about 55 lbs. per cubic ft., or 6 lbs. per sq. ft. of surface. These slabs are admirably adapted for building purposes, especially for roofs and flooring, as they may be nailed directly to wood joists without injury, or clipped to steel beams or purlines. The side of the slabs which comes in contact with the steel form is comparatively smooth and solid, whereas the other presents the appearance of a concrete sponge.

Figure 4

In construction work this porous side is kept towards the outside. For roofs and flooring the surface is treated with a cement grout finish. Because of the light weight of this material the roof members of a steel frame structure may be of a much lighter construction than would be required otherwise. Although light in weight, the slabs are very strong, they are designed like a reinforced concrete slab. The steel near the bottom takes care of the tensile strength and stresses, and the cement finish that is applied to the top makes a perfect bond with the rough surfaces and takes care of the compressive stress produced by the bending moment. In the way in which the slabs are used on roofs they will carry a live load of 40 lbs. per sq. ft. (which is required by most building departments) with a factor of safety of over 6. In tests, specimens have broken at 300 lbs. per sq. ft. on a 32-in. free span. Figures 3, 4 and 5 illustrate the use of Porete for roofing.

Because the slabs are reinforced with a surplus of steel, a greater amount of cement finish on top will increase their strength. For instance, in concrete floors, after a ½" thickness of cement is applied to the top of the slabs, this makes them strong enough to carry heavy floor loads of 125 lbs. per sq. ft. with a factor of safety of 5, where beams are set on on 32" centers. This gives a very light weight, shallow and strong floor construction, especially valuable for mezzanine floors.

On account of the cellular structure of Porete, it makes a much better heat insulating material than solid concrete. Tests made by Lichtin* indicate that the heat insulating value is about the same as that of wood. This is an additional feature which makes Porete desirable on roofs. The saving of steel on account of the light weight of Porete is especially pronounced on a long span construction.

Porete is Portland cement concrete of uniformly honeycombed structure and combines the durability of concrete with the lightness of wood. It is made of Portland cement and sand only, and contains no other material except the expanded metal with which it is reinforced. Porete is made of a very rich cement mix and expanded metal is thoroughly coated and protected against corrosion. It contains approximately one-third of solid matter and two-thirds of air cells and has therefore about one-third the weight of solid concrete. Porete roofing slabs are a factory controlled product, accurately reinforced with expanded metal of the proper size. In combination with a cement finish which is applied in the field, they make a lighter fireproof roof than any other. a Porete roofdeck is not waterproof in itself, no more than reinforced concrete or similar roofs. It has to be covered with an approved waterproofing, which is ordinarily a three or five ply built-up felt roof, stuck to the Porete roof with hot pitch and covered afterwards with slag or gravel. Where a ready roofing is prefered, a ⅛" thickness of Porete-Nail finish is applied in the field.

Porete is a good heat insulating material. Its structure presents a series of small, independent holes, from 1/16" to ⅛" in diameter, in which the best insulating material, dead air, is entrapped and it prevents effectively the passage of heat through the slab. The heat insulating value of Porete is about equal to that of wood of the same thickness, as can be seen by the accompanying table. Porete, therefore, fulfills one of the principal requirements for satisfactory roofs, that is, it will keep the heat and cold out and prevent undersirable sweating underneath through condensation of moisture on the inside in cold weather.

This lower heat conductivity of Porete is one of the factors that make it an excellent fire resisting materials. A piece kept red hot over a Bunson burner for two hours and thrown into cold water will show hardly any change, even when this is repeated several times.

Porete roofs are adapted for flat and steep roofs. The slabs can be cut with ease and fitted to conform to the most complicated roof design; a single slab will cover 5 1/3 sq. ft., weighs only 32 lbs. apiece and one man can easily carry one.

Table of Comparative Weights

Type of Roofing	Wt. per sq. ft. Pounds
N. C. Pine, 1" thick	4
Porete, 1¼" thick	7
Cement Tile, 1½" thick	16
Gypsum Tile, 3" thick	13
Solid Book Tile, 2½" thick	16
Solid Concrete, 3" thick	37½

Table of Heat Transmission

Material	Wt. per cu. ft.	Heat Transmission
Concrete	138 lbs.	50.7
Gypsum	62.5 lbs.	24.4
Porete	61 lbs.	22.6
N. C. Pine	40 lbs.	20.7
Air Cell		
Asbestos	13 lbs.	9.6
Cork Board	11.7 lbs.	8.0

The heat transmission given in the table is the quantity of heat in B.T.U.'s that flows through one square foot of the material of a thickness of one inch, having a difference in temperature of 1 degree F. between its faces in 24 hours. These figures have been determined by the air box method.

Figure 5

For data used in the preparation of this article, the writer is indebted to Mr. Ernest Walter, Vice President of the Porete Manufacuring Company, and inventor of the process.

*"Relative Heat Conductivities of Some Insulating and Building Materials," Chem. & Met., vol. 24, p. 388, March 2, 1921.

Devine Co. to Manufacture English Diesel Engine

J. P. Devine Company, of Buffalo, N. Y., announce they have concluded arrangements with Vickers-Petters, Ltd., of Ipswich, Eng., for the sole manufacture and sale of the famous Vickers-Petters semi-diesel oil engines in the United States and its dependencies.

This engine contains many novel features, which are patented by this company. The J. P. Devine Company are now making elaborate preparations for the immediate manufacture of these engines.

Date Set for Advisory Committee Conference

The date for the conference of the newly appointed Advisory Committee from the Paper Industry for the Department of Agriculture with Secretary Wallace of the Department, has been definitely set for Thursday, February 7, at Washington.

This will be the first meeting of the Committee which has been asked by Secretary Wallace to represent the paper industry in conference with him as to problems involving the Department, particularly those relating to forestry, the Forest Products Laboratory and similar bureaus which are devoting special attention to problems affecting the manufacture of pulp and paper.

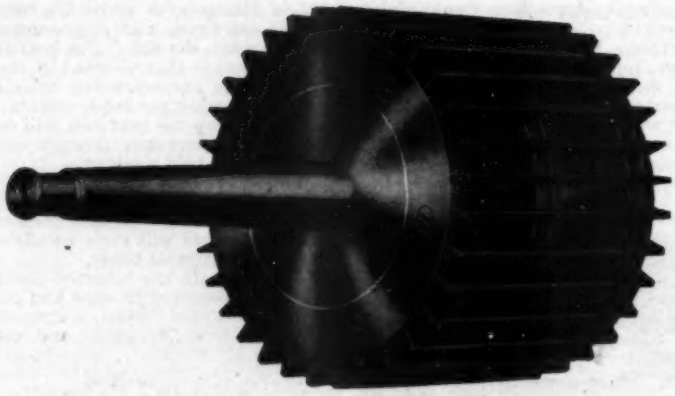


Fig. 1. The Bandless roll with ring in place

Quickly Demounted for Refilling

The Valley Bandless Roll is so constructed that any bars may be removed without taking the roll from the tub. All that is necessary to remove one or more bars is to detach one of the end rings and drive the bar or bars 2 inches endwise. They may then be lifted out with ease. One, ten or any and all of the bars may be removed with one ring off and one ring in place. The roll is filled in the usual manner with steel fly bars and oak strips, cut to fit the space between the bars. The results obtained in using the roll are satisfactory in every way and the time of filling is reduced over 50%. New bars for replacement purposes may be obtained at approximately the same price as the old style bars, notwithstanding the additional punching required. Bandless rolls not only save time, but make a difficult, unpleasant job one easy to perform.

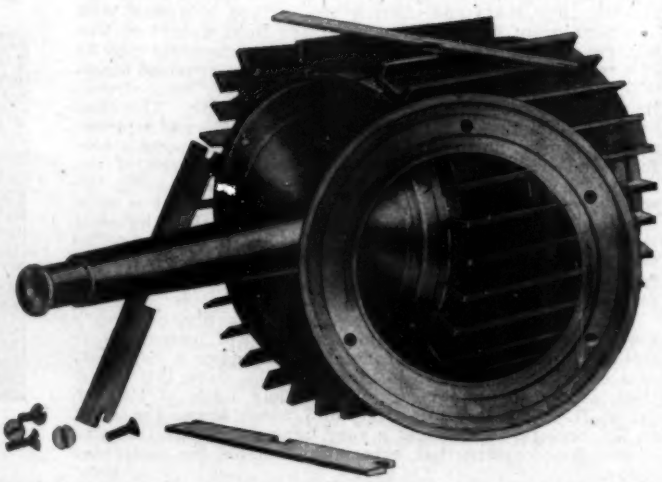


Fig. 2. The Bandless roll dismantled, showing parts

Fig. 3. This ring holds the bars in place. It is made of cast steel and one of them is applied to each end of the roll. It is a driven fit and is further held in place by brass-headed counter-sunk machined screws.

Built by

Valley Iron Works Company

Plant:
Appleton, Wis.

New York Office:
350 Madison Ave.

Apprenticeship in the Pulp and Paper Industry

The following is an outline of a scheme for apprenticeship in paper mills which Secretary W. G. MacNaughton has drafted for the Joint Committee on Apprenticeship representing the Canadian Technical Section, the Superintendents Association and the Technical Association.

There is to be a meeting on the subject in connection with the Annual Meeting of the Canadian Technical Section to be held at the Ritz-Carlton Hotel, Montreal, on January 24, and the outline will be presented for discussion as part of the report of the Joint Committee.

It is planned, if possible, to have in attendance the members of the committees of the three associations interested as well as mill executives who have agitated for a system of apprenticeship for the development of skilled paper mill workers.

It is expected that the drafted outline will serve as a basis on which a system may be built.

APPRENTICESHIP is distinct from, although related to, the training of skilled operators as well as vocational education for pulp and paper mill workers. There is in addition the development and training of foremen and superintendents where there is necessary not only knowledge of the operations involved and skill in them but also executive ability and judgment. When a system of apprenticeship has become fully developed and its value appreciated, it might follow that the higher skilled operators both in pulp and paper mills would require to have taken the apprenticeship course; but at its inception it is not to be expected that individual mills will be able to take on more than one or two apprentices a year since in some departments, during training, they would to a certain degree be supernumeraries. If, too, it is arranged to furnish instruction or assistance at stated period, in their studies, it might be necessary to give it during a period when they would otherwise be employed.

Remuneration During Course

As to remuneration, at the beginning of the course it should be sufficient to cover the living cost but should not be more than that of the lowest common labor. During the course the rate should be increased a small amount at the end of each period of training, the increase being dependent on the attainment of proficiency in the particular phase of training.

If an apprentice started at $50 per month with an increase of $5 at the end of each period, at the completion of fourteen periods he would be receiving $120 per month. On the basis of twenty-five days of eight hours each the final rate would then be sixty cents per hour. The base rate might be $71 per month with increases of $3.50 per month, giving the same rate at the end. It might be advisable to leave the matter of compensation to individual agreement or perhaps to fix the relation which the apprentice rate should bear to that of a regular operator.

Educational Qualifications

The educational qualifications required for apprenticeship should be high school graduation or its equivalent so that the apprentice could proceed at once to the special studies without being obliged to devote time on elementary subjects.

Courses Provided

In the correspondence courses provided by the University of Wisconsin and the Massachusetts Division of University Extension, there are the following unit courses: Mechanical Pulp, Sulphite, Soda and Sulphate Pulps, while among those of the Institute of Industrial and Domestic Arts there are in addition Beater Room Practice, Paper Machine Operation and Paper Finishing. In any scheme for apprenticeship these courses and others that may later be devised, should be linked up with periods of practical training in well operated mills, of sufficient length to insure efficiency. The end desired is the production of paper makers, and since under modern conditions most of the paper made is from wood pulp rather than from rags, the paper maker should know how to make the chief pulp used in the kind of paper he elects as his specialty.

Kind of Paper

The chief kinds of paper made in largest volume, and neglecting the special boards and special papers, are news, book or printing, wrapping, tissue, writing and board. They all differ in fiber composition, preliminary treatment, method of paper machine operation and to a certain extent in the type of machine used. In consequence of these rather wide differences the apprentice would almost of necessity have to select early in his training the particular kind of paper in the making of which he desired to become proficient.

Considering the kinds of paper named they may roughly be classified as follows:

Kind	*Chief Pulp Used*	*Type of Machine*
News	Mechanical	Fourdrinier
Book or printing	Bleached sulphite and soda, or waste paper	Fourdrinier (straight or Harper)
Wrapping	Unbleached sulphite, or sulphite & mechanical	Fourdrinier (ordinary or M. G.)
Tissue	Unbleached & bleached sulphite, and rags	Fourdrinier and single cylinder
Writing	Bleached sulphite, and rags	Fourdrinier
Boards	Waste papers, and mechanical pulp	Multi-cylinder

At its inception no attempt should be made in apprenticeship to cover special board or special papers of various kinds. In all cases the minimum educational requirement should be high school graduation, and it should begin by a period of practical experience in the mill laboratory, perhaps with similar periods in each phase of training, especially those dealing with pulp manufacture.

Study and Practical Work

The course of study for the apprentice should be divided into major and minor subjects, depending on the kind of paper upon which he is specializing. The major studies should cover the branches of chief importance while in the minor ones he would get a general knowledge of allied subjects. It is attempted to outline the courses of study and character of practical training that might be required with the suggested minimum period of practical work.

Courses of study: 1—Mechanical pulp; 2—Sulphite; 3—Soda; 4—Sulphate; 5—Bleaching; 6—Beater room practice; 7—Waste paper; 8—Rags; 9—Paper machine operation; 10—Paper finishing.

NEWS

	Practical Training	*Weeks*
Major Courses 1, 2, 9	Laboratory	10
	Mechanical pulp	30
	Beating and mixing	10
Minor Studies 3, 4, 5, 6, 7, 8, 10	Machine operation	80
	Finishing	10
		140

PRINTING OR BOOK

	Practical Training	*Weeks*
Major Courses 2, 3, 5, 7, 9, 10	Laboratory	10
	Waste paper, soda or sulphite	30
	Beating	10
Minor Studies 1, 3, 6, 8	Machine operation	80
	Finishing	10
		140

WRAPPING

Major Courses 2, 4, 6, 9, 10	Laboratory	10
	Sulphite or sulphate	30
	Beating	10
Minor Studies 1, 3, 4, 5, 7	Machine operation	80
	Finishing	10
		140

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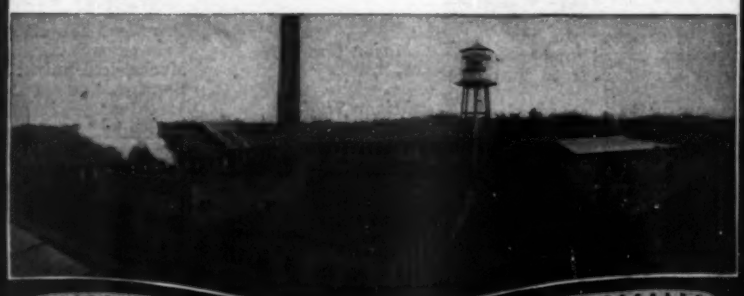

	TISSUE	
Major Courses	Laboratory	10
2, 6, 9, 10	Sulphite	30
	Beating	10
Minor Studies	Machine operation	80
1, 3, 4, 5, 7	Finishing	10
		140
	WRITING	
Major Courses	Laboratory	10
2, 5, 6, 8, 9, 10	Rags or bleached sulphite	30
	Beating	10
Minor Studies	Machine operation	80
1, 3, 4, 7	Finishing	10
		140
	BOARD	
Major Courses	Laboratory	10
1, 5, 6, 7, 8, 9	Waste paper	30
	Beating	10
Minor Studies	Machine operation	80
2, 3, 4, 10	Finishing	10
		140

Laboratory—Analysis of materials and tests used in manufacturing control, 10 weeks.

Mechanical pulp—Wood department, grinders and screens, 10 weeks each.

Sulphite pulp—Acid plant, digesters and screens, 10 weeks each.

Soda and sulphite—Liquor making, digesters and screens, 10 weeks each.

Waste paper and rags—Cooking and washing, 10 weeks each.

Paper machine operation—Winder, reel, backtending, machine tending, 20 weeks each.

A New Shake for Fourdriniers

Nearly all paper makers have believed that fine papers, or those requiring a thorough interlacing of fibres, could not be made on wide machines. They are, no doubt, correct, in so far as the conventional type of Fourdrinier is concerned.

On a narrow machine, on which better papers have been made, the shaken Fourdrinier is comparatively light in weight. Consequently there is very little inertia to be overcome by the shake. This means that at every swing of the Fourdrinier, a sharp jolt is given the wire at the time of reversal of the movement. This jolt is required to interlace the fibres.

On the larger machines that have the usual shake, there is necessarily more weight to move and greater inertia to overcome. Furthermore, on the wide machines it has always been necessary to cushion this shake, on account of the greater weight, to save wear as well as to prevent the shake mechanism from undue shock. This cushion destroyed, in large measure, the feature that made the original shake successful on narrow and light machines.

Another reason that the shake has been discarded on high speed and wide machines—other than news—is that it was possible only to obtain about 250 shakes per minute, maximum. Therefore, if a machine was running 500 feet per minute, the sheet received but one shake in two feet of paper, or but one in four feet at 1,000 feet per minute. It is apparent that at these speeds the ordinary shake is of little or no benefit.

To overcome these difficulties, The Beloit Iron Works, Beloit, Wis., have designed and patented a shake and a Fourdrinier to accomplish what a narrow, slow running machine does. This means that the Fourdrinier must be light in weight, the shake very heavy, or of new principle in design, and attached to the machine in a different manner than heretofore.

A combination of all these features has been adopted. The whole Fourdrinier is not shaken. The usual main rails are stationary and merely support the shaking parts. The table rolls are supported on light but stiff aluminum rails, attached at intervals to the main rails by flexible leaves. The breast roll is supported separately in the same manner.

Thus on a 160" wire, 75' long, the shake has nearly five tons less to vibrate on this improved Fourdrinier than on the old type. This enables obtaining the "jolt" so necessary in interlacing the fibres. By eliminating all this weight the periods of vibration are speeded up, thus giving the paper maker as effective a shake at higher speeds as he had previously at slower speeds.

In developing this shake mechanism, new principles have been applied. The shake is operated by an adjustable speed motor which gives the operator a big range of vibrations to suit the sheet he is running. Furthermore, the amount of throw may be adjusted while the machine and shake are running—no shutting down.

To still further assist the paper maker, the shake mechanism is connected in a number of places—ordinarily four. This enables table roll rails to be made lighter without whipping.

Thus the following have been evolved:

1st. A shake that truly performs.

2nd. A shake effective on higher speeds and wide machines.

3rd. A suitable Fourdrinier to go with such a shake.

4th. A means of applying the shake where it is needed.

5th. A shake that is adjustable both as to speed and throw and pitch of wire changed—all or any one, while the machine is running.

As a "proof of the pudding," one of these new Fourdriniers, having the above features, is operating on Kraft, and a fifty-pound sheet made thereon tests from 68 to 72 or from 36 per cent to 44 per cent more than the usual "point to the pound."

On another Beloit machine, on Kraft, the paper is testing 127 per cent, while a machine of another make in the same mill, running 25 per cent slower on the same stock, produces paper testing but 93 per cent. Thus the "Beloit," with the disadvantage of higher speed, is producing a better formed and higher test sheet than that made on the other.

Volume IV of Text Books Complete

The publishers of the five-volume set of Manufacture of Pulp and Paper submit the following report concerning Volume Four:

"Although it was promised as a Christmas present we have this much desired book for a New Year's gift. The fact that the date of publication on the title page is 1924 goes to show that the editor was promising more than he could perform. However, we have the book and will make a good start for the new year by reading it. Perhaps its advent will stimulate many of those who have the third volume in their bookcase to read it as well.

"It is no exaggeration to say that most of the inquiries that are made about wood pulp are very fully answered in the third volume. By a hasty glance through the present volume the same may be said about the subjects it covers.

"It is a book of 527 pages, divided into six sections, as follows:

"Section 1—Preparation of Rags and Other Fibers, 62 pages, 19 illustrations, by E. C. Tucker.

"Section 2—Treatment of Waste Papers, 72 pages, 21 illustrations, by E. T. A. Coughlin.

"Section 3—Beating and Refining, 80 pages, 32 illustrations, by A. B. Green, with a Bibliography of 6 pages by C. J. West.

"Section 4—Loading and Engine Sizing, 49 pages, 14 illustrations. Loading by Ross Campbell and Engine Sizing by J. A. DeCew.

"Section 5—Coloring, 54 pages, 4 illustrations, by the Dyestuffs Committee of TAPPI in collaboration with Otto Kress.

"Section 6—Papermaking machines, 210 pages, 83 illustrations, by J. W. Brassington.

"In addition to the authors the editor and the committee in charge of the preparation of the work credit a long list of companies and individuals for helpful service and advice.

"All that was said of the third volume covering the Preparation and Treatment of Wood Pulp may be repeated. Its successful accomplishment is unique as it represents the cooperative effort of the pulp and paper industry of a whole continent. Never have such care and expense been devoted to the preparation of an industrial work of instruction and reference.

"Each section after being written, was examined and criticized while in manuscript by several competent authorities. The book is in fact the work of more than one hundred men prominent in the industry.

"When the final volume of the set, now well advanced, is completed it would be difficult to exaggerate the importance of the achievement to extend too much praise to the editor-in-chief, J. N. Stephenson."

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Monorail Conveying

By R. J. SCHADT
Washington Pulp and Paper Corporation

AS THE manufacture of newsprint develops into a more highly competitive industry, the necessity for cutting costs in all departments becomes imperative. One department that can usually bear reduction is that pertaining to the handling of materials. Waste in material handling can be usually remedied by the proper installation of conveying systems. The cost and maintenance of the conveyor must offset the cost of handling before installation, in order that a saving be made. The proper conveyor to suit the specific handling problem must be chosen to result in a maximum economy. In this connection each mill's handling problem is different due to many things such as the geographical setting, kind of wood used, location of the different units of the plant, kind of paper made, size of rolls, etc. As to the best and most efficient method of conveying, each engineer has his own viewpoint. A very efficient and practical method of handling materials is one used at Port Angeles, Wash., by the Washington Pulp & Paper Corporation. This mill has a production of 130 tons of newsprint per day and is located in a very strategic place as to wood supply and limestone. Being situated on deep water the paper transportation problem is readily solved. Besides the water facilities, the plant is served by the Chicago, Milwaukee & St. Paul Ry., rail transportation being used, however, only when necessary.

The mill is very well laid out as the accompanying drawing indicates. The cost of handling materials is cut down very appreciably by the straight line movement of product from saw mill to finished paper. The straight line movement is coupled with compactness which shortens the distance of conveyance to a minimum. The whole plant from the groundwood mill to the finishing room is contained in one continuous building about 100 feet by 700 feet.

As the drawing shows, the main conveying problem consists of the transporting of wood to the sulphite and groundwood mills and the moving of the finished paper to the wharf along with the conveying of other miscellaneous supplies. All this is done by monorail conveyors.

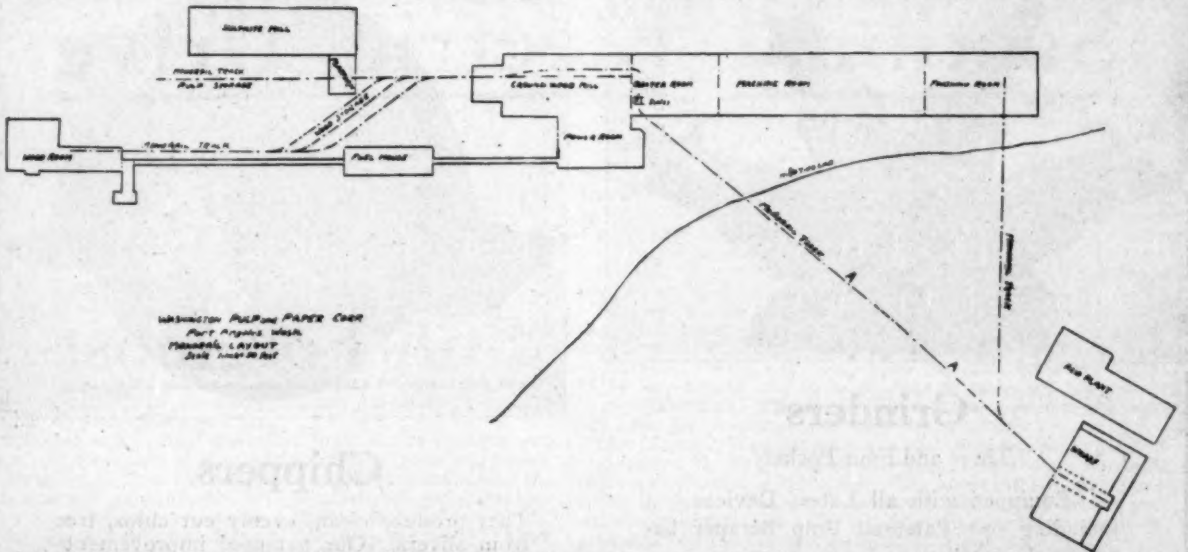
The monorail car, which is composed of a controlling cab is connected to the rest of the car by a self-locking swivel joint to allow for turning the load and this to the car proper by means of four cables which wind on two drums. The revolving of these drums causes the ascent or descent of the grabbing arrangement as the case may be. The conveyor is operated by one man. The hooking and unhooking of the load is done by the men loading and unloading the carrying racks.

Buy Both Logs and Pulpwood

The wood used in this mill is bought both as logs and as pulpwood. The wood as logs is run through the sawmill and leaves in four-foot lengths ready for the grinders. This is

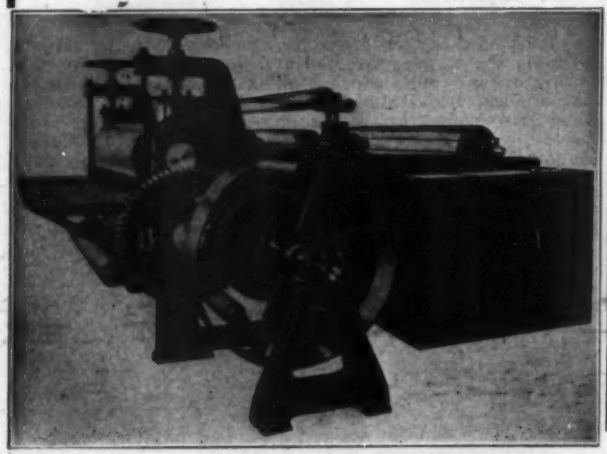
loaded into one cord racks and taken to the grinder room by means of the conveyor. Here it is lowered to the grinder room floor. A small monorail conveyor operated from the floor takes the racks of wood to the individual grinders as needed.

The pulpwood is brought in by truck, rail and water. The truck pulpwood is loaded into racks on the road under the monorail between the wood storage and the groundwood



and the hoisting and driving equipment is a regular lumber carrying type made by the Pawling-Harnischfeger Company, of Milwaukee, Wis. It is propelled by a 25-horsepower motor. The lifting mechanism is also operated by a 25-horsepower motor which provides sufficient power to lift five tons in a very short period of time. The speed of the lift as well as the speed of the car are controlled by driven controllers. The conveyor part which connects with the load consists of a metal frame with four legs, each of these legs has a self-closing grab hook which encircles the cross beams on the carrying racks. This is the method by which the load is connected in the conveyor. This whole hooking arrangement mill. The railroad tracks pass under the monorail just outside of the power room. Here again the wood is unloaded from the cars into the racks and this taken to the wood room or wood storage as the case may be. The pulp coming in by barge is unloaded any place betwen the marks AA on the drawing in similar manner as above. There are sufficient racks to give a few days' supply of wood for the grinder room. The surplus wood is stacked while in the racks under the monorail at the place designated wood storage. The monorail at this point is about 75 feet above the ground, so by criss-crossing the racks a considerable quantity of wood can be stored here. Under ordinary operating conditions the

Pulp and Paper Mill Machinery



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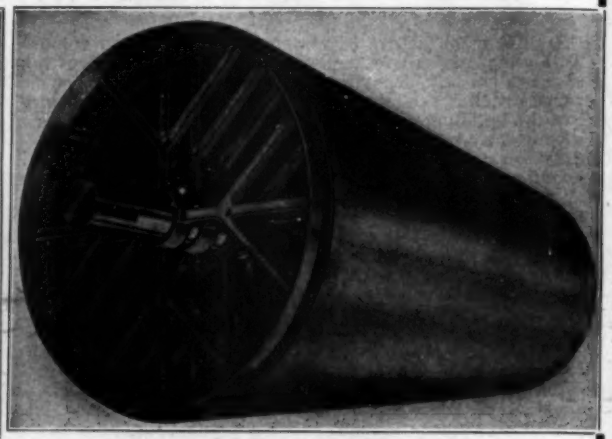

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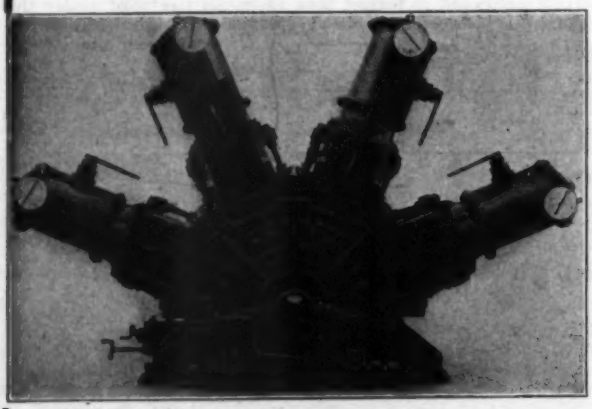

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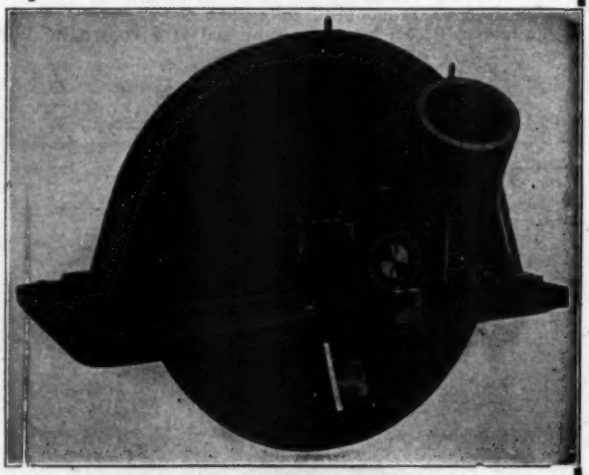

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wood is coming in about as fast as it is being consumed. The supply of racked wood on hand is kept practically constant, the sawmill furnishing wood when there is not sufficient incoming pulpwood to keep all of the racks filled. At other times the wood furnished by the sawmill goes direct to a pile to be used in the sulphite and groundwood mills. By so doing, the wood is handled or loaded in the racks only once and is not handled again until fed to the grinders or chippers.

The plant until the time of operation of its own sulphite mill, used purchased sulphite baled pulp. This was brought in by boat and unloaded at the wharf and stored under the monorail. By so storing the sulphite pulp one handling is saved as it is only necessary to hook the bales to the monorail conveyor and take them to the beater room. For this purpose a special constructed rack is used so that fourteen bales (about 5,400 pounds) can be moved at once. The round trip from the beater room to the dock, together with loading and unloading of the fourteen bales, takes about six minutes. The monorail passes over a scale in the beater room, so if any weighing should be done it is simply a matter of dropping the load onto the scales.

The finished paper is wrapped and weighed in the finishing room. The finishing room will hold, without crowding, a little over a day's run. This paper, after the final weighing, is placed on a specially constructed rack and then taken by the monorail to the wharf for storage until there is sufficient tonnage to make a cargo. The monorail takes six standard newsprint 70-inch rolls weighing about 1,300 pounds each at once. By this means five men, including the monorail operator, can move and store the total output of the plant per day in six hours or less.

Cores, wrapper and rope are stored under the monorail in an enclosure between the finishing room and the switch. By so doing the finishing room is kept clean of stored supplies and yet they are quickly and daily available.

Discussion of Soft Rubber Press Rolls *

By R. H. WHITNEY

The B. F. Goodrich Co., Akron, Ohio

THE first thing I want to impress upon you is that we (The B. F. Goodrich Rubber Company) are not paper makers. What small knowledge we have of paper making is the result of our endeavors to make the right kind of rubber products to meet paper mill needs. In what I have to say about these new soft rubber covered rolls I trust you will remember that our position is that of a rubber manufacturer, and try not to criticise shortcomings in the finer details of paper making too severely.

For several years we have been trying to develop a soft rubber press roll covering which would not corrugate quickly. Last winter while at the Hammermill Paper Co. at Erie, Pa., Mr. Oberman, the general superintendent there, went into great detail as to the physical properties required in a soft roll, and to him and Mr. Packard, their paper mill superintendent, we are indebted for the present "High Speed News" roll stock which is accomplishing more than we had hoped for.

We were aiming at a roll covering to test as soft as 80 on the plastometer with the ⅛" point—a rubber that would have great resiliency and life; one that would be fine grained and take a smooth finish, and which would have the "guts" to stand up in service. Through new developments in compounding and curing, our laboratories gave us an even softer stock, testing between 90 and 100, that had all these desired qualities to a marked degree from laboratory tests. For instance, in a life oven test this new compound lasted fourteen times as long as the best rubber stocks we had previously been able to apply to press roll service.

Frankly it was against my better judgment to even try out such a soft stock and if they had not insisted, the roll which was installed at Erie on June 13th, would not have gone in. That same roll, running on a first press, is still going and has shown no signs of corrugating although it has been in six months. Since then, every Fourdrinier there has been changed over to these soft press rolls and two more rolls have now been in over three months, with the same excellent results.

The felt life has showed an improvement of from 25 to 50 per cent in some instances, and an increase of this kind will pay roll costs in a few months. This however is not the big saving, as they are getting away from felt marks and can use more open and harder twisted felts without marking the sheet.

Not being a paper maker, I cannot fully appreciate the better formation of sheet which is produced with the soft rolls. Any of you men could hold up a sheet pressed with these soft rolls and get the difference between it and one run through the usual hard rolls.

Naturally the greater contact area gives more uniform squeezing throughout the width of the sheet, and this results in fewer breaks and more uninterrupted production.

The possibilities of using more open felts also allow for taking out more water without increased pressure. A soft roll will not take out as much water as hard rolls under like conditions. It is, however, possible to increase the total effective pressure on a soft roll without breaking down the structure of the sheet or causing the felt to mark.

In addition to the rolls running at Hammermill, we now have in operation or on order rolls for S. D. Warren, A.P.W., Champion Coated Paper, Champion Fibre Co., Newton Falls, Great Northern, Hanna Paper, DeGrasse Paper, Island Paper, International Paper, St. Croix Paper, The Richardson Co., and twenty or thirty more representative mills throughout the country.

We might add that the Michigan Paper Co. has a roll covered with "News," a stock similar to "High Speed News" but slightly harder, running on a smoother press. Mr. East can tell you about that.

Mr. Elmer East (Michigan Paper): "We have had the roll in about a month and are pleased with it. Mr. Camp here has direct charge of the machine and can tell you more than I can."

Mr. Camp (Michigan Paper): "The roll is the best we ever had. It does not pit and the machine men say 'it is the only real roll we ever had there.'"

Mr. J. T. Murphy (Valley Iron Works): "Do you use the same crown on these soft rolls as on harder ones?"

Answer: "No: a greater crown is necessary. Replacing a roll testing 50 on a 132" machine with 1⅛" thickness of rubber it was necessary to increase the crown from 33/1000" to 45/1000" diametrical. Individual machines, widths, cover thickness, previous densities, and weighting will call for different changes. From 20 per cent to 35 per cent seems to be the range of increase required."

Mr. Murphy: "I should think it would be impossible to increase the crown enough if the soft rubber flattens out much more than it does on present rolls."

Answer: We cannot give any figures regarding the actual distortion. We can say that the rolls are working and giving the results wanted in practical service by increasing the crown to meet conditions as outlined previously.

Mr. A. Bryant (Bryant Paper Co.): "Can you use the same weights or are more necessary with the soft roll?"

Answer: "On one machine since installing one of these soft press rolls, a seventy five pound weight has been added on each end. The roll is standing up without any sign of corrugation and the press is taking out all the water they want."

Mr. C. L. Harter (Rex Paper): "Won't increasing your weight increase your power and cost money?"

Answer: "Yes, naturally. However the power increase will not be over two or three horsepower, and the saving on one felt will more than cover this in a month for all the extra power that would be used in a year. Incidentally, by using a more open felt it will not be necessary to increase the weight and in fact you can take out more water by this means than you could with a harder roll and tighter felts. This would allow a saving in steam at the dryers."

Mr. W. H. Sievert (Michigan Carton Co.): "You stated that it is possible to increase production. Will you please explain this?"

Answer: "With a more uniform pressing there are bound to be less breaks and it is possible to maintain top speeds more of the time. The possibility of more open felts will also cut down felt washings and work the same way."

Mr. Harter: "You did not mean you could increase speeds?"

Answer: "I did not mean that speeds had been increased, but rather, better maintained. The transmission may limit speed increase. There are however, possibilities which you will know better than I do, for increasing machine speeds by co-ordinating the other equipment with soft rolls."

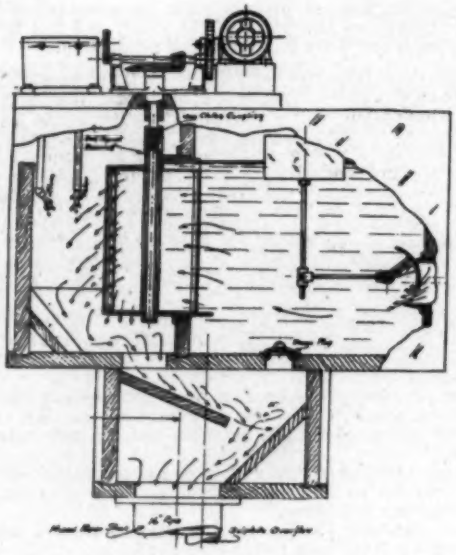
Mr. Redmond (Kalamazoo Paper): "Will you please explain again why a soft roll will cut down the breaks?"

Answer: "Greater surface contact and more give to the rubber allows for irregularities in the stock, or foreign matter passing through the press without breaking down a wide area of the sheet, or any part of it not being pressed. A lump that would break the contact between hard rolls for a considerable distance will not have any effect on the softer rubber, except at the immediate point of contact."

Mr. E. G. Wightman (Hawthorne Paper): "Will this roll last long enough without corrugation to make it pay?"

Answer: "The felt saving alone should pay the entire roll

*Discussed at the Michigan Division of the Am. Paper and Pulp Mill Supts. Ass'n Meeting of Dec. 20, 1923, at Kalamazoo, Mich.



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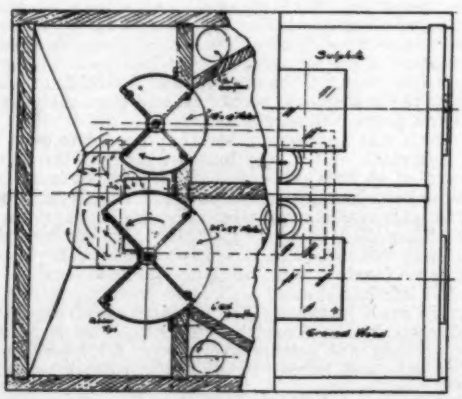

bill. While we have made some extravagant sounding claims for these soft rolls, we are basing our claims on savings accomplished by practical paper makers. The rolls have run as long as six months without corrugating and will unquestionably stand up as long or longer than rolls compounded along previous lines, which were twenty or thirty points harder."

Mr. George Pountain (Allied Paper): "Have you any exact figures on felt saving?"

Answer: "We have records showing an increase of from 29 to 39 to 42 days; another of an increase from 12 to 18 days. One mill has estimated they will save $100,000 on a $325,000 yearly felt bill. There is, however, nothing in the line of exact figures which can be applied in a general way."

Question: "How do these rolls grind?"

Answer: "One roll was reground after giving about three times the average service on a high speed news machine and it was only necessary to take off 1/64", whereas it was usually from 1/16" to ⅛" with the old rolls. The rubber grinds smoothly with no tendency to flake or check. Naturally, since it is very tough, it is not a fast grinding stock."

Question: "What thickness of cover is generally used?"

Answer: "Anywhere from ¾" to 1½". The thicker coverings are more common on the fast machines where they count on frequent regrinding. There are probably more rolls covered under 1" thick than over.

"Right here it might be well to say that the amount of metal and the way metal is bulked in a core has a marked effect on the density of the rubber, because of the heat-diffusing properties during the cure. The thickness of the rubber cover will also account for a slight difference in the density, as will the temperature at the time the readings are taken.

"It is therefore impractical to try to hold roll cover densities within small limits, and a variation of plus or minus six points is actually close enough to meet any practical service requirements. Rolls harden somewhat in service and are reground time and again until the density is often 20 points harder than originally. When you figure that you use these rolls after they have been reground and aged, expecting such variations, it is, in a way, unreasonable to insist that a new roll be of any exact density."

Mr. Sievert: "Do you advise these soft rolls for board manufacturers?"

Answer: "The Richardson Co. are using them with good results on primary presses; however, a board mill would be taking a big chance to jump from rolls testing 10 to 30 to one of these very soft rolls on their presses.

"We have compounded two harder stocks along the same lines as 'High Speed News,' 'News,' which tests between 65 and 75, and 'Kraft' which tests between 42 and 52. This last will undoubtedly become common for cylinder machine presses. 'News' is now being tried out on cylinder machines, and under certain conditions should prove economical. However, at the present time we are not in a position to make any definite claims as to what these new stocks will do in this class of service."

Mr. Wightman: "Did I understand you to say these soft rolls will not corrugate?"

Answer: "Decidedly no. Any soft roll will corrugate sooner or later. We say that these rolls are not corrugating nearly as soon as other rolls of anywhere near the same density, and that they are standing up to an extent which makes it practical to use soft rolls where it was not practical to use them before."

Mr. E. H. Gilman (Bryant Paper): "Well, I'm going to have one of them anyway, and I believe they are what I have been looking for. It's the best looking rubber I have ever seen."

The Application of the Cottrell Electrical Precipitation Process to the Pulp and Paper Industry*

P. E. LANDOLT and N. W. SULTZEN

Staff, Research Corporation, New York, N. Y.

THE manufacture of pulp and paper from wood is one of the largest basic industries of the United States. Highly perfected as these manufacturing operations are from a mechanical standpoint, it is fully recognized that certain improvements in operations would be desirable and certain wastes in material would result in direct savings. It is the purpose of this paper to show wherein certain of these advantages can be realized with the Cottrell electrical precipitation processes.

Description of Cottrell Electrical Precipitation Processes

Numerous papers have been published from time to time describing these processes and the theory underlying their operation. No detailed description of the processes will therefore be attempted at this time, but a brief outline of their general application will be given. These processes are used to remove finely divided suspended particles—whether solid or liquid—from air or gases, practically independent of the gas temperature and the corrosive nature of the material. For example, metallurgical fume from gases from smelting and refining furnaces; cement dust from gases from rotary kilns used in the manufacture of cement; soot, ash, dust, etc., from gases from boiler plants; acids—sulphuric, hydrochloric, phosphoric, etc., from manufacturing and other operations; tar, oil, etc., from combustible gases of all kinds, and numerous others. The result is that the Cottrell electrical precipitation processes have found a place in many industries; in fact, in some they are considered a standard piece of apparatus.

Advance in Art of Electrical Precipitation

In the past few years great strides have been made in the art of electrical precipitation. The relation between the various constants appearing in electrical precipitation have been thoroughly studied and analyzed, with the result that an installation can now be designed and planned in accordance with rational relations and factors. Likewise, great improvements have been made in the design and construction of the equipment, doing away entirely with operating difficulties that formerly were experienced. This improvement in design and construction has also resulted in equipment much more economical to construct and operate. The result is that the Cottrell electrical precipitation processes are now furnished and installed complete on a contract basis with full guarantee as to operation. These facts are exemplified by the numerous successful commercial installations constructed in this manner during the past four or five years.

Application to the Pulp and Paper Industries

During this period of progress in the art of electrical precipitation and extension of the fields of its application, there has been but little real effort made to emphasize the suitability of these processes to the operations involved in the manufacture of pulp and paper. Most of the possible applications in this industry are similar to commercial applications in other industries and have been handled by commercial installations of the Cottrell electrical precipitation processes. It is proposed, therefore, to describe some of these possible applications that may prove of interest to the pulp and paper manufacturer, referring at the same time to similar operations or problems in other industries for which the Cottrell processes have proved very satisfactory.

Black Ash Recovery

Probably the most apparent application for these processes is in plants manufacturing pulp by the soda process. The waste soda liquor from the pulp digesters is first concentrated to about 30 degrees to 40 degrees Baume in vacuum or other forms of evaporators. This liquor is then fed to rotary kilns where the remaining moisture is driven off, leaving a black, powdery mass known as black ash, which can again be used in the digesters. During this treatment in the kiln, a considerable portion of the more finely divided particles is carried along in suspension in the waste gases. By actual measurements in several plants, this loss figured as carbonate, will amount to from 3 per cent to 5 per cent of the kiln output, also figured as carbonate. This loss actually escapes through any form of dust chamber or baffles and is an absolute loss.

The type of Cottrell equipment proposed for the recovery of this loss is very similar to the equipment being used at the present time for fume recovery in metallurgical plants. This is the "plate and wire" type of precipitation which has been generally adopted for this character of problem on account of its economical construction, compared with the "pipe" type formerly used. The installed cost of such equipment is, of course, dependent upon the magnitude of the operation and the volume of gas to be handled. In general, however, figuring the black ash recoverable at $20 per ton of carbonate and allowing all fixed charges against the installation and all operating charges, the net return on the investment should amount to from 25 per cent to 40 per cent, depending largely upon the magnitude of operations.

Burner Gas Cleaning

Another possible application where the purpose is primarily one of improving plant operation is for the purification of cleaning of the SO_2 gas used in the manufacture of sulphite

*Paper read before the Tappi meeting, held in conjunction with the National Exposition of Chemical Industries, Grand Central Palace, New York City, September 20, 1923.

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liquor. These gases may be produced either from the roasting of pyrites or the burning of free sulphur. In the former case there is a possible two-stage treatment, first for the removal of dust from the hot gases and second for the removal of acid mist from the cool gas. To remove the dust, the gases may be treated hot—1000 degrees to 1200 degrees F.—in a precipitator constructed of brick and steel (or special alloy if necessary to withstand high temperatures). This type of precipitator is in use for removing dust from such gases in chemical plants where pyrites or zinc ores are roasted. The second stage treatment, which will apply also if free sulphur is burned instead of roasting ores, is for the removal of the sulphuric acid mist from the cooled gases. Acid mist has always been one of the easiest materials to precipitate by the Cottrell processes, and this treatment is entirely similar to the removal of acid mist from the cooled SO_3 gas in contact acid manufacture. Several such installations have been in successful use for years in some of the contact acid plants and several more are now under construction.

Waste Heat Recovery for Drying Operations

Another application is for the cleaning of hot waste gases from boilers, furnaces, kilns, etc., so that these gases can be used for drying operations. The fact that this application is practical is illustrated not only by the use of the processes for cleaning hot SO_3 gas (see above), but also by the fact that the processes are being applied for removing dust, ash, cinders, etc., from stack gases in power plants. The gases in the latter case could readily be used for drying purposes if there were any such need in power plants. Such a need is present in pulp and paper mills and the sensible heat value of such hot gases would represent a very desirable and cheap source of potential heat.

Miscellaneous Gas and Air Cleaning

There are numerous other applications of the processes around mills of this character for the removal of dust and other particles from the surrounding air and air drawn in for ventilation purposes. Not only will the clearing of this air result in a better product—for example, a paper free from spots after sizing—but working conditions for the employees will be greatly improved.

The above simply presents in a general way the manner in which the Cottrell processes can be applied to the operations in this industry. The possibilities are by no means limited to the applications described, but these will give a plant operator a general idea of the use of these processes so that if a possible problem arises he can readily judge whether the Cottrell electrical precipitator is suitable.

Operating Features of Cottrell Processes

Some of the more striking operating features of the Cottrell processes which make them so suitable for operations of the character described herein might well be emphasized: *First*, there is the low resistance to gas flow. Owing to the operation and design of this apparatus practically the only back pressure is the frictional resistance and this, even in a large installation, will seldom exceed ⅛ to ¼ inch of water. This permits operation with simply stack draft or if a fan is necessary owing to local flue conditions, a minimum of power is required. Compare this with the back pressure of 6 to 12 inches of water frequently encountered with cloth filters, bags, scrubbers, etc., and the considerable direct saving of power will readily be appreciated. *Second*, the material collected is in a form easily handled and disposed of. If a dust or fume, the material is collected dry and easily prepared for subsequent use or treatment. If a liquid the material collected runs readily from the precipitator and is at the highest possible concentration as it is not diluted with unnecessary water. *Third*, depreciation, repairs and replacements are a minimum. The precipitator can be constructed of practically any kind of material so that provision can be made in its construction to resist the corrosion of any kind of material whether acid or alkaline, hot or cold. *Fourth*, practically any degree of operating efficiency is obtainable depending upon requirements. If necessary complete removal of the suspended particles is obtainable or—as is usually found ample—90 per cent to 95 per cent can be obtained. A careful consideration of the above and the fact that the labor requirements are a minimum, space requirements and power generally small, indicate clearly the advantages offered by the Cottrell processes for problems of this character.

Installation Costs

No attempt will be made in this article to give any general figures on the installation cost of Cottrell equipment. While the design is largely standardized, nevertheless each specific problem has distinctive features of construction and to generalize is apt to give misleading information. In general, however, it might be stated that the installation cost of Cottrell equipment compares very favorably with other means for handling a similar problem.

Preliminary Tests

As has already been stated, practically every possible application of the Cottrell processes in the pulp and paper industry will correspond closely with some existing installation in some other industry. Therefore, preliminary Cottrell tests are seldom necessary to demonstrate the suitability of these processes although if desired such tests can readily be made for nominal cost. Frequently, however, where the purpose of a Cottrell installation is to recover valuable materials, sampling tests are necessary or desirable to determine the amount and nature of the possible recoveries. A method of making such tests has been carefully worked up and the results have been considered satisfactory and conclusive to many large companies—some of whom are users of the Cottrell processes.

From the foregoing, it can readily be appreciated that the Cottrell processes have become a standard method of gas treatment and that undoubtedly there are problems in the paper and pulp industry to which they could with advantage be applied. By means of preliminary studies or tests, the results obtainable can be very accurately predicted and the element of risk is eliminated or reduced to a minimum.

Michigan News

Kalamazoo, January 1, 1924.

Superintendents' Association Meet

The Superintendents' Association held a meeting on December 29th at the Park-American Hotel. At this meeting Mr. R. H. Whitney, manager of the Detroit Branch of the B. F. Goodrich Rubber Company, of Akron, Ohio, gave a talk on soft rubber press rolls, or "High Speed News," as they call

Michigan Superintendents at Kazoo, Dec. 20, 1923

their product. This complete discussion is given elsewhere in this issue.

Owing to the nearness of the holidays, the crowd that gathered was very small. Those present were: Albert Linders, Allied Paper Mills; Michael Redmond, Kalamazoo Paper Co.; John D. Henderson, THE PAPER INDUSTRY; Alfred Bryant, Bryant Paper Co.; A. G. Whightman, Hawthorne Paper Co.; Mr. Burns, Valley Iron Works; Harry Urick, MacSimBar Paper Co.; W. H. Sievert, Michigan Carton Co.; A. E. Camp, Michigan Paper Co.; C. L. Harter, Rex Paper Co.; Elmer East, Michigan Paper Co.; E. H. Gilman, Bryant Paper Co.; R. H. Whitney, Goodrich Rubber Co.; L. H. Chenoweth, Goodrich Rubber Co.

Bryant Holds Annual Christmas Gathering

On December 21st and 22nd the Bryant Paper Co. held their Second Annual Christmas gathering for their employes and families in the auditorium of their new office. On the night of the twenty-first, the gathering was for the employees and families of the office, power plant, Bryant and Superior Divisions.

On Saturday, the twenty-second, the Milham and Imperial divisions gathered together. Nick Colignon, of the Imperial, acted as chairman for the occasion. Mr. P. C. Servass, assistant to the president, spoke in behalf of the management. He stated: "Making money is not our first aim. What we want is contented employees, and the profits will take care of themselves. We are very glad to be able to keep all our help employed, in spite of the conditions now prevailing in the

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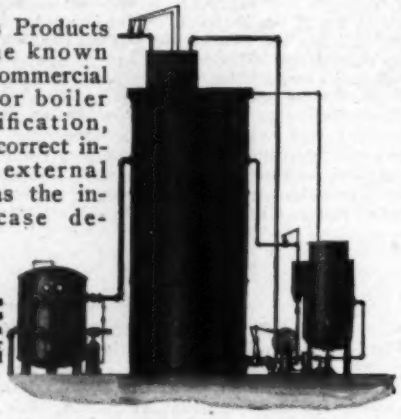

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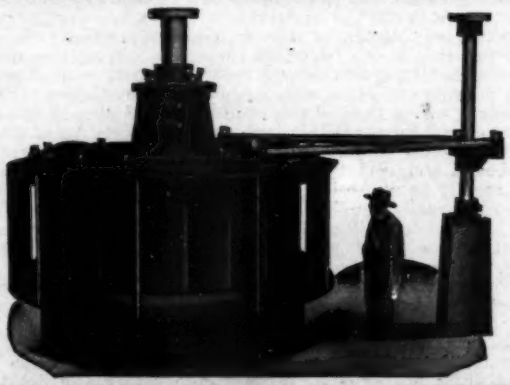

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paper trade. Business is quiet, but during the fall all our departments have been running."

All the children received a box of candy and refreshments were served to all. The meetings were a huge success in every way.

American Box Board and Manufacturers Realty Co. Merges

Merger of the American Box Board Company of Grand Rapids, Mich., and the Manufacturers Realty Company of that city, as the National Box Board Company, with a capitalization of $2,475,000 and 125,000 shares of no par value stock is being effected. The step is being taken, it was said at a directors' meeting held on December 19th, to bring the business and the real estate holdings under the ownership of the one company. All of the real estate heretofore has been owned by the Manufacturers' Realty Company, controlled largely by the same personnel.

The adoption of the name National Box Board Company is largely a legal formality to effect the merger and the company may later resume the name American Box Board Company, it is understood. The merger will also modernize the financial structure. The National Box Board Company has absorbed 31,912 shares of the preferred stock of the American Box Board Company and 16,800 shares of Manufacturers' Realty Company's stock. They are both preferred and prior preferred stock, paying 7 per cent and subject to redemption December 12, 1953.

The company, which was organized about twenty years ago, has shown a pronounced expansion practically every year since that time. Officers of the American Box Board Company, which, it is understood, will serve for the National Box Board Company, are: President, T. H. Goodspeed; vice-presidents, S. A. Morman and L. T. Wilmarth; secretary, W. H. Gilbert, and treasurer, John W. Goodspeed.

Dispute Over Patent Rights

The Michigan Carton Company, of Battle Creek, Mich., a number of years ago, installed auxiliary air drying systems on their cylinder drying machines under certain patent rights. These systems were remodeled about five years ago, so that the owners of what is commonly called the Vapor Absorption Systems, have claimed that these systems, as remodeled, interfere with their patent rights, known as the Belcher & Wilson Patent No. 1,035,678.

The owners of this patent are E. A. Briner of East Orange, N. J., and his exclusive licensee, the J. O. Ross Engineering Corporation, of New York and Chicago.

The Michigan Carton Company have caused the following notice to be published to correct any false impression that may have gotten abroad that that company was wilfully or knowingly operating these installations in violation of their recognized patents.

"It was not the intention of the Michigan Carton Company to molest or interfere with the owners in their patent rights granted by the government; so that after investigation by their attorneys, they have paid the owners a substantial sum in settlement of their claim in addition to other good and valuable consideration."

Many Improvements in Superior Division of Bryant Company

The Superior Division of the Bryant Paper Company went down Saturday, December 22d, for a two months' rest. The mill will undergo a great many changes. As construction operations have been going on steadily for three months past, they have reached the limit that could be done without shutting down the machines.

These improvements are being rushed, so that the mill can be started at the quickest possible time. While the plant is down, the mill is to be electrified, so that power can be furnished by the new power house under construction and practically finished now, to run the whole plant. The boiler house is to be done away with entirely. Steam, to be used for heating and drying paper, is to run over in a huge pipe, on a trestle, from the power plant. This steam line is nearing completion.

At Muskegon, Mich., on December 20, it was announced that six hundred dollars in 7 per cent ten-year gold bonds will be sold by the Central Paper Company of that city. These bonds will be secured by first and general mortgages and are to be used for the purpose of completing extensive improvements, additions and extensions of the Muskegon plant and to provide working capital to provide for increased business. The Central Paper Company has enjoyed a splendid growth since it was reorganized 23 years ago, since 1900, when the company was organized with a capital stock of $350,000 under its present management, it has made net earnings every year and has paid dividends in cash and liberty bonds of more than $2,000,000. The present value of the depreciated plant is estimated at $2,188,650.

Western Board Makes Big Changes

Jacob Parent, superintendent of the Western Board & Paper Co., states that the improvements recently made have certainly improved his plant. By adding three new cylinders to their engines, and installing two new engines, new heaters, new Jordans, new cylinders on the machine, lengthening out the machine and by adding new dryers, they have increased the production of the machine from fifty-five tons to eighty-four tons per twenty-four hours.

The machine started without a hitch. A very few minor troubles were experienced, but no more than what they expected, considering the radical changes that have been made.

The state of Michigan has completed the first phase of the economic survey of the forest resources of three counties and much valuable information on the present condition of the forests and forest land in this region has been secured, announces the Lake States Forest Experiment Station. A part of the study was devoted to the potential capacity of these lands to produce forests as well as the possibility of developing them for other kinds of use. This study is of great importance in Michigan, once an important forest-producing state and now almost entirely cut over.

The Plainfield Paper Company, Childsville, Mich., has increased its capital stock from $250,000 to $300,000, of which $100,000 is common and $200,000 preferred. The preferred stock is subject to redemption at par March 3, 1853, and to meet this obligation, the company's articles provide that an amount equivalent to at least 5 per cent of the authorized preferred stock shall be annually placed in a sinking fund.

Frank Monahan, superintendent of the New Parchment Mill, spent the holidays at Watertown, New York.

John Davis, of the Frank H. Davis Company, of Cambridge, Mass., spent Christmas in Kalamazoo.

Wisconsin News

Port Edwards, Wis., January 1, 1924.

Vocational Education in the State of Wisconsin

While the Vocational Educational Committee of the Pulp and Paper Industry have not as yet been able to publish volumes 4 and 5 of their textbooks, this has not stopped the paper mills in the state of Wisconsin from making very rapid progress in this line.

What is thought to be the largest work of this kind carried on was started last year in the plants of the Nekoosa-Edwards Paper Company of Port Edwards, Wis., as what they termed "Industrial Education," this term being coined by them. The management had felt for a long time that work of this sort would be very helpful to both employer and employee, and this was started in earnest after a thorough investigation.

Classes were organized at both Port Edwards and Nekoosa in electricity, shop sketching, steam and paper making. This work was taken up through the Extension Division of the University of Wisconsin, the classes being in charge of professors of local high and training schools, the papers being sent to Madison for checking and correction. One hundred twenty-two men entered the Industrial Educational School and of this number 94 finished, or 77 per cent. A large number of the men who did not finish moved out of town, and some others were forced to drop out on account of sickness, but the percentage of those that finished was beyond expectation. The men paid understanding that when they finished the course, the company would reimburse them for the amount they put in. On the completion of the course each member of the classes who successfully completed his course or courses was presented with an engraved certificate for each course completed and his money refunded him. Those who did not finish were obliged to pay for their own course. It was felt that this was one of the best investments that the company ever made.

The work done at the above plants was watched with considerable interest by other mills in the Wisconsin and Fox River Valleys, and this year other mills have started similar courses, the first of these being the Wausau Sulphate Fibre

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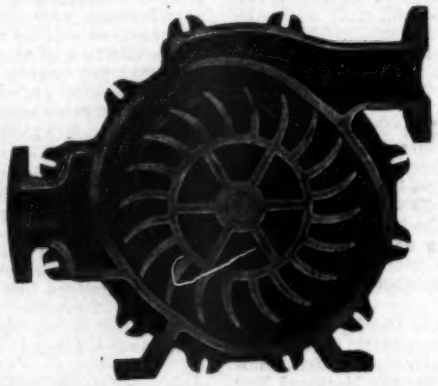

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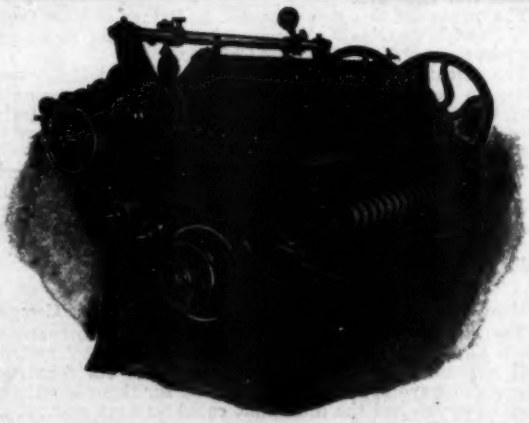

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Single, Duplex, and Diagonal

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LAWRENCE, MASS.

Company of Mosinee, Wis. Other paper mill concerns are now negotiating for this important work.

The first class held at Mosinee was well represented, there being 30 mill employees attending this meeting, which was in shop sketching. This class will meet every week and papers will be sent to Madison for correction. Mr. Norman Stone, of Wausau, has charge of these classes, the class in electricity was organized Monday, December 17th, and the paper mill men started their class on Wednesday, the 19th.

It is expected that many more mills will have started this work within the next month and this magazine will keep in close touch with this very important project.

Many of the classes have been organized at Port Edwards and Nekoosa, Wis., and the attendance will surpass last year's. This will be in full swing before the end of December.

Consolidated Water Power & Paper Company Start New Machine

The Consolidated Water Power & Paper Co., of Wisconsin Rapids, Wis., have completed the construction work on their new mill at Biron, Wis., and the new 1,200-foot, 162-inch Fourdrinier newsprint machine which was built by the Beloit Iron Works, of Beloit, Wis., was started on November 29th. This machine is now running at approximately 850 feet per minute and is making nearly 70 tons of newsprint paper daily. The speed of this machine is being gradually increased.

This is one of the finest equipped machines running today. It has an 80-foot wire, which is level, and the wire is equipped with the new type of automatic wire changing device.

It has a very unique flow box and adjustable slice, two Bird screens, one suction box, also a suction couch and a suction press. The machine is driven by the latest type of General Electric Company drive and it is practically noiseless in operation. The Woodsome system of drying is used, and there is a hood down the back side of the dryers. The Thiel economizer is also in use. The new machine room is exceptionally well lighted and ventilated and the place looks more like a parlor than a machine room. The new mill is painted in white as well as the entire machine.

The installation of this new machine brings the total of the Consolidated Water Power & Paper Company's Biron plant to three machines, with a present production of over 130 tons of newsprint. This will be increased as soon as the new machine is speeded up.

This plant has already been visited by many paper makers and every one expressed his opinion as it being one of the finest mills ever put into operation.

New Homes at Port Edwards Nearly Completed

Many workmen have been busy constructing new homes for the workers of the Nekoosa-Edwards Paper Company at Port Edwards, Wis.

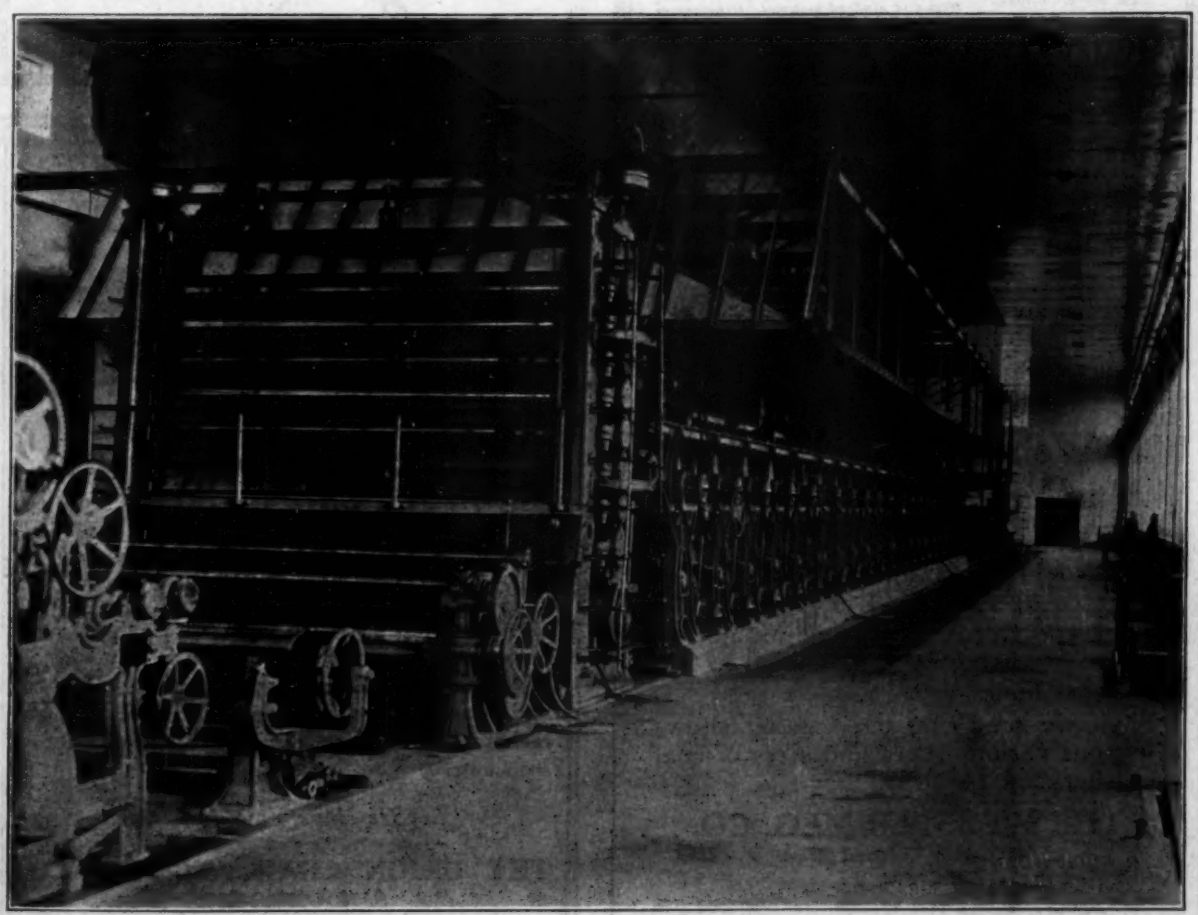
This work was started some time ago and there have been constructed ten new homes, many of which are completed with the exception of the stuccoing which will be done immediately after the cold weather is over.

It was arranged with a local contractor that during the fall season, and by constructing ten houses that they could be built much cheaper than if the work was let to the individual or if they were put up at various times.

There are three or four different styles and types of houses so that every man can buy according to his means. All of the houses are very neat in appearance. There are styles ranging from a 4-room one-story to an 8-room two-story. Each house has a concrete foundation, a full-sized basement, the dwelling itself being built of tile with a stucco finish. Each is equipped with a furnace.

The price for this class of a house is exceedingly moderate as the minimum price is $2,500 the maximum $4,500, and this includes such items as sidewalks, sewer and water connection, lighting and also heating.

The Nekoosa-Port Edwards Building and Loan Association was organized on September 1st for the purpose of enabling men who are now paying rent to own their own



New 162 inch Beloit newsprint machine, painted white, installed at Consolidated Mill, at Biron, Wis.

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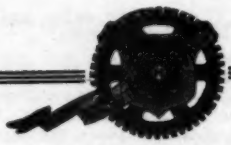

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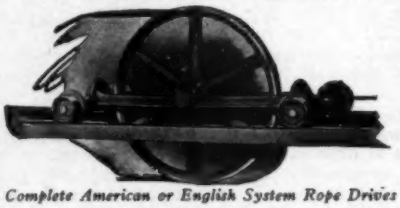

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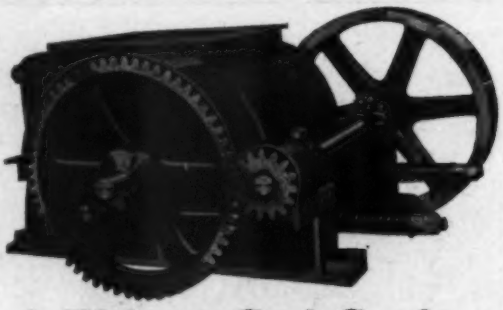

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homes and also give an opportunity to others to save money, a small amount at a time and still get a good dividend on their investment.

Nearly all of the houses above mentioned have been purchased from the company through this Building and Loan Association, as well as a number at Nekoosa, where the other mill of the company is located. Preparations are being made by which it is hoped that during the year 1924 there will be constructed in Nekoosa a goodly number of new homes as well as at Port Edwards.

The board of directors of the Building and Loan Association have declared a dividend of 6 per cent on all stock, both paid up and installment, so this will net the investors 2 per cent on their money which has been in since September 1st. The construction of these new homes adds greatly to the appearance of the already thriving village, and it is hoped that by the aid of this association that every man in the employ of the company will soon own his own home.

Improvements at Dells Pulp & Paper Company

Extensive Improvements at the Dells Pulp & Paper Co., of Eau Claire, Wis., which were started some time ago, are rapidly progressing.

The above company has permission from the Railroad Commission of Wisconsin and is building a new dam 400 feet in length and this will carry a 26-foot head. This dam will be of steel and concrete and will contain a gate section with thirteen steel tainter gates 26x20 feet. The new dam will be located a short distance below the old dam and this will be able to handle much more water than the old one, as the Railroad Commission insisted that the dam be of ample capacity to take care of any normal flood condition. The forms are all in for the gate section and some of the piers are partly poured. The apron is all on.

Work on the new power house and pulp mill has been started, the excavation being completed, the construction will begin immediately. The power plant and grinder room will be one structure and will be 120x116 feet, the entire building will be of reinforced concrete construction. There will be one hydroelectric unit built by Allis-Chalmers Co., of 1,600 horsepower capacity. Three other units of water wheels of 1,600 horsepower will be direct connected to 3-4 pocket grinders now being built by the Green Bay Foundry & Machine Co. These wheels may later be changed and turned into hydroelectric units and they are so arranged that this change can be made.

The wet machine and screen rooms are in a separate building 60x120 feet containing two stories. This is located a short distance from the grinder room. Under this entire building there will be a decker stock chest. The machinery will consist of twelve wet machines, two wood thickeners, five Impco screens, as well as the necessary knotters and sliver screens. Both of these departments will be motor-operated.

The addition of this new equipment will make the production of pulp about 110 tons per day and this will amply take care of their own requirements.

Mr. L. A. DeGuere, of Wisconsin Rapids, Wis., is making these extensions and he is assisted by Mr. W. E. Ule, of Stevens Point, as construction foreman. Mr. DeGuere has an engineer right on the job as well as three draughtsmen. The cost of these improvements will amount to approximately $700,000.

Kraft Pulp vs. By-Products

The Kraft By-Products Association of Minnesota, Wisconsin and Michigan Kraft Pulp Manufacturers, met in Chicago at the Union League Club on Friday, Nov. 30th, at 10:30 a. m.

Those present were: Wausau Sulphate Fibre Co., represented by O. Bache-Wiig; Nekoosa Edwards Paper Company, represented by L. M. Alexander and B. T. McBain; Marinette & Menominee Paper Co., represented by J. H. Delbridge; Minnesota & Ontario Power Co., represented by H. G. W. Forrester; Stevens Point Pulp & Paper Co., represented by E. G. Goodell; Ontonagon Fibre Company, represented by Gus Enderlein; Prof. A. H. White, of Ann Arbor, Mich.

The meeting was called to order by B. T. McBain, chairman. The purpose of the meeting was for discussion of Dr. White's reports and recommendations and arrangements were completed for a committee composed of O. Bache-Wiig and B. T. McBain with Dr. A. H. White as third and consulting member, to immediately plan and erect a lime sludge recalcining plant and to employ a competent engineer for the purpose. The names of two experienced lime plant engineers were suggested and, no doubt, one of these will be selected. This is only one of the waste-saving schemes to be gradually worked out.

It is said that the by-products in some industries are of more value than the original product. The Kraft By-Products Association hopes to prove this in the case of the Kraft pulp industry.

Makes Visit to All Wisconsin Mills

Mr. W. D. Mount of Lynchburg, Va., for many years connected with the Matheison Alkali Works at Saltville, and Professor White of the University of Michigan, Ann Arbor, Mich., in company with B. T. McBain, chairman of the Kraft By-Products Association, visited all the mills of the association in the state of Wisconsin during the last week of the year 1923. While on this trip data was secured which will enable Mr. Mount to make a complete report on the possibilities at the plants at Mosinee, Stevens Point, Nekoosa and Oconto Falls, Wis., along the lines of reclaiming and recalcining lime sludge now a waste product.

As soon as Mr. Mount's report is received another meeting of the Kraft Association will be called for a final decision and arrangements.

On this trip very encouraging reports were made by the different mills of the market conditions and all looked for a busy time shortly after the first of the new year 1924.

Accepts Position with Canadian Paper Co.

William Kraske, sulphite superintendent of the Consolidated Water Power & Paper Co., of Wisconsin Rapids, Wis., since their sulphite mill was put into operation, has resigned his position with this compnay and accepted one with the Spruce Falls Company, Ltd., at Kapuskasing, Ontario, Canada. This company is the Canadian branch of the Kimberly-Clark Company.

Mr. Kraske was chairman of the Northwest Division of the Superintendents' Association in which he was very active. He was recently re-elected chairman at the Appleton convention. He was known as Captain Kraske, as he was captain of Battery E, 120th Field Artillery and was regarded by State National Guard officials as one of their best officers. Many of his associates and friends will be interested to know of his change and we wish him luck in his new position.

New Dam at Grandmother Falls Completed

The new dam which the Tomahawk Kraft Paper Company has been constructing on the Wisconsin River at Grandmother Falls is now finished. This dam will furnish power for the new paper mill and work is rapidly progressing on the power house.

While the construction work is completed, there are, nevertheless, fifty men still at work on the new dam, but this crew is now engaged in tearing down the large hoist and other stationary machinery, the pump house and later will tear down the false work of the dam.

Ohio News

Middletown, O., January 1, 1924.

Consolidation of Gardner-Harvey Paper Company Interests

Consolidation of all the Gardner-Harvey Paper Company interests located in Middletown, Ohio, has been announced by officials of the company. The merging is for the purpose of simplifying the operation of the various mills and the general conduct of the business, according to E. T. Gardner, president of the concern.

The actual merger occurred December 31, so that the new plan may become effective with the opening of the new year. The new company will issue 20,000 shares of no-par common stock and $300,000 worth of cumulative preferred stock at 6 per cent.

The companies to be dissolved are: The Colin Gardner Paper Company, Gardner Harvey Paper Company, Gardner Box Board Company, Gardner and Harvey Company, and the Universal Printing Company. The property of the Enterprise Machine Company also is owned by these interests.

Officers of the Gardner and Harvey Paper Company have been elected as follows: E. T. Gardner, president; Colin Gardner, vice-president; Milton S. Johnson, secretary; Robert B. Gardner, treasurer; George H. Harvey, Tom Harvey, Jr., Arthur R. Harvey, J. C. Leech, W. H. Swan, J. J. Hain and E. H. Turner, directors.

The Gardner-Harvey paper interests have increased rapidly and substantially through the past few years. It was in 1900 that the Colin Gardner Paper Company was organized by the late Colin Gardner, Sr. By keen business acumen the enterprise was a success from the start. Some time afterward George and Tom Harvey become affiliated with Mr. Gardner in the establishing of the Gardner-Harvey Company and

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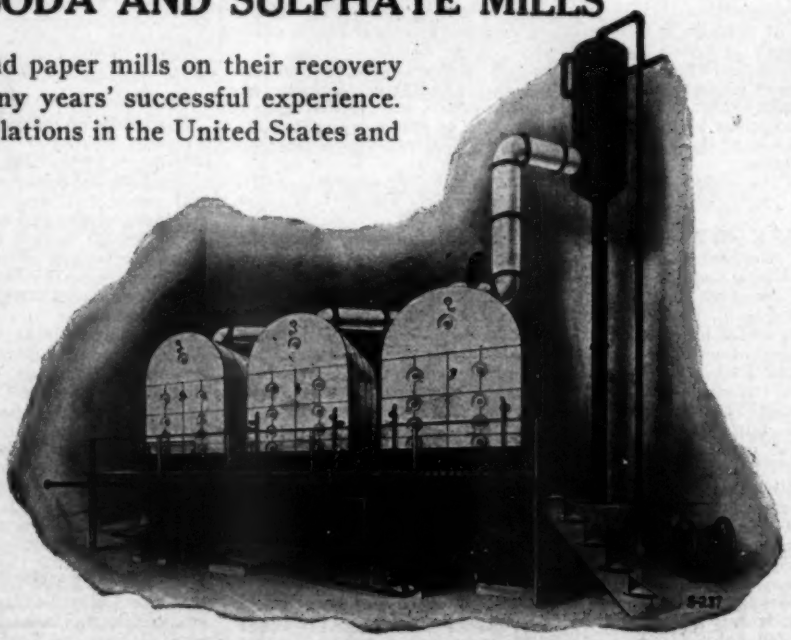
Harvey, Ill. (Chicago Suburb)



Standard Swenson Horizontal Tube, Triple Effect

the building of the factory on Charles street. When the National Box Board Company failed a few years ago that plant was purchased and the Gardner Paper Board Company organized to operate it.

Then came the acquisition of the Universal Paper Products Company of Clyde, Ohio. As the companies had been turning out paper board boxes and cartons for years, unprinted, the idea of printing their own products was conceived, and the deal for the Universal Company was consummated. A large new plant has been added for this company.

The Gardner and Harvey Company was organized in a small way several years ago simply as a purchasing and selling corporation, and it is this name which will now be carried through the new arrangement.

Superintendents Hold Meeting

Meeting at the Hotel Manchester, Middletown, O., December 14, seventy-five members of the Miami Valley division of the Pulp and Paper Mill Superintendents' Association gathered to hear talks by Ralph A. Lewis and P. D. Gephart.

In the business meeting which preceded the addresses, Homer Martindale, Ben Bishop, of Middletown, H. W. Server and C. A. Miller, of West Carrollton, were appointed on a safety committee, which grew out of a plan of the national association to have a similar committee in every division.

Mr. Lewis, of the General Electric Company, Cincinnati, spoke about the installation and operation of a flow meter to measure water used in paper mills. He told of the economic importance of the device. "Under the boiler you burn some sort of fuel for which you have to pay," he said, "in order to evaporate the water to steam for use in your manufacturing processes. Each boiler should yield a certain number of pounds of steam for each ton of coal burned. The steam should be metered in order to keep a check on the boiler efficiency, discover losses, check the operator and keep the evaporation in proportion to the fuel consumed."

Mr. Lewis told of the advisability of flow meters in a paper mill because of the number of kinds of power to be measured. The loss of water power seems to be generally disregarded in plants where flow meters have not been installed, he contended, and this almost constant waste of water is more costly than a loss of electricity because of the fuel used to evaporate it.

P. D. Gephart, the second speaker, is connected with the Mellon Institute of Pittsburgh. He discussed the types of ventilators used in paper mills, showing the difficiencies of some systems and the efficiencies of others. He used a working model to demonstrate his points to his audience, who were deeply interested in the subject.

Plans are nearing completion for the construction of an addition to the Sorg-Ogelsby mills of the W. B. Ogelsby Paper Co. of Middletown, O. This addition will consist of a 2-story structure, 100x100 ft., and is estimated to cost about $175,000. Machine installations of three washing machines, rotaries, and equipment for the production of paper bleaches from ureine gas and lime water will be included. L. C. Anderson is vice-president of the company.

New England

Boston, Mass., January 2, 1924.

There are certain definite conditions in the paper market of this section that it is hoped 1924 will improve. Of these the scramble for orders on sulphite bonds, and machine finish book papers is most notable. The year 1923 ended with a deplorable tendency to undersell on these grades for the purpose of getting business that has reduced many mill as well as dealer profit margins to the vanishing point. But apart from this we see a favorable outlook for 1924 and in looking back all will agree that 1923 was a year of solid achievement in the paper trade.

Notable Achievements of 1923

Briefly some of the outstanding developments among New England paper mills in 1923 can be summed up as follows: The installation of an electric steam producing and drying plant at Rumford together with a new machine installation, and wood conveyer that has increased their capacity to 340 tons of book, coated, and other printing papers daily, operations on the new basis to start about February 1; the completion of a wonderful new electric generator plant at Anson, Me., capable of supplying 7,500 horsepower by the Great Northern Paper Co. and the enlargement of the grinder room at Madison across the river to provide for the increased power; the installation of one of the most modern Fourdriniers in the world at the mill of Tileston & Hollingsworth Co., at Mattapan, Mass., machine built by Rice, Barton & Fales of Worcester, Mass.; the completion by the last named Worcester company of the largest Kraft paper machine in the world for the Southern Paper Co. of Moss Point, Miss.; the installation of a powdered coal burning plant by the Pejepscot Paper Co., who thereby introduced a new principle in boiler room equipment to New England paper mills, whereby a saving in coal, labor and increase in efficiency and plant cleanliness is obtained; and the definite announcement by the Eastern Manufacturing Co. of South Brewer, Me., that they had become entirely self sufficient in the matter of pulpwood supply through an established policy of planting each year trees in excess of the number cut.

This is truly a series of major developments of which New England can be proud, and while it covers large mills there are a multitude of smaller events which are equally deserving of mention.

Morey & Co. of East Cambridge, Mass., well known dealers in paper making chemicals, etc., have acquired the Market Warehouse Co. on Farnsworth St., South Boston. So far as is known the Moreys have acquired an interest in this plant as an investment, there being no indication that they intend to make it an adjunct of their mill supply business as yet.

Hollingsworth & Vose Co., the largest rope paper makers in the country, with mills at West Groton and East Walpole, Mass., have moved their main offices from 141 Milk St. to 333 Washington St., Boston, in the newly completed Province building. They occupy 4,500 square feet of office space, 1,000 more than in their old location. Business with this company has been exceedingly good during the year past.

L. Keith Southard, general manager of the International Purchasing Co., buyers of rope for a large group of paper mills, returned to Boston in December from an extensive visit to his sources of supply in foreign countries.

Connecticut Cost Men at Holyoke

The Connecticut Valley Division of the Cost Association of the Paper Industry met at the Hotel Nonotuck, Holyoke, Mass., on Tuesday evening, December 11. Professor J. A. Crook of the Department of Economics of Amherst University addressed the gathering on "Labor and Its Relation to Management." His years of research into capital-labor problems gives the professor a strong background and his talk was closely followed.

His conclusions are that the present social order to endure must breed a relationship of mutual confidence and co-operation. Failure he feels will certainly result from mutual suspicion and antagonism. The management policy that conducts business in a fashion calculated to build up intelligence, good will and health of labor will succeed.

The great water storage project fostered by the International Paper Company, Hollingsworth & Whitney Co., the Great Northern Paper Co. and companies in other lines of industry, looking to the creation of a huge reservoir at the headwaters of the Kennebec River appears more and more likely of fruition. A storage and water power project combined is desired by these paper mills to insure a steady water supply to their mills along the Kennebec, which at present runs to drought levels in summer and to floods in spring. Governor Baxter of Maine was the cause of the failure of a bill introduced in the last session of the Maine legislature which would have granted the necessary authority to build the dam. He is now seeking a conference with the heads of the paper mills concerned to be held in Boston this month.

The Bath Iron Works of Bath, Me., one of the largest shipbuilding companies in the United States and a builder of navy destroyers, has turned definitely to peace time production and is making Warren magazine pulp grinders. Shipments are now being made to the mills of the Great Northern Paper Company. The machines are designed for wood in four foot lengths and are of heavy construction, each unit weighing 95,000 pounds. These machines are said to mark a distinct advance in the method of grinding wood into pulp. They have been carefully designed and are based on experience obtained from the first machines of this kind, which are now in successful operation at the St. Regis Paper Company in Watertown, N. Y.

Tests made at the Kennebec Pulp Mills at Skowhegan, Me., as to the possible practical value of certain Mississippi river land timbers for mechanical pulp manufacture have proved unsatisfactory. The company tried the experiment on a carload of White Bay, Magnolia, Black gum, and Tulip from those southwestern forests, but they were not adapted to

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Layne Central Co., Memphis, Tenn.
Branch Office, Crowley, La.

ground wood purposes. The would-be pulp produced from these tests, which were made on a total of nine cords, has been shipped to Boston where it is reported the Arthur D. Little Co., which operates an experimental paper mill on River St., Cambridge, will make tests on them for sulphite and other chemical pulps and better results are expected, particularly in the making of soda pulps.

The New England Paper & Pulp Traffic Association has field a request for sixth class proportional rates on printing and wrapping paper from interior mill points to Boston, on such shipments as move from Boston to the Pacific coast via the intercoastal steamship lines. The present basis is fifth class and is so unreasonably high that New England mills fare badly in competition with those of the middle west for Pacific coast business. The matter will be argued before the New England Freight Association on January 15.

A well founded report is circulated in Boston coming from Maine sources that the International Paper Company will shortly announce the sale of its plant at Rumford, Me., to the Continental Paper & Bag Mills. It is learned that the Continental Paper & Bag Mills have submitted the proposed purchase to stockholders. The desire for ownership comes through the fact that the Continental consumes upwards of sixty per cent of the normal production of the local International Paper Co. plant in average seasons in their bag mills at Rumford.

The Adams Paper Company of Wells River, Vt., Herbert Crabtree, general manager, is erecting an addition to its plant which will contain 10,000 square feet of floor space and provide for new machinery and generally improved facilities. The company is a tissue paper manufacturer. The cost of the new addition is announced as $70,000, the construction to be of brick. James Lowe of Woodsville, N. H., is the contractor.

Jack pine, which grows in the southern part of Maine, has just been reported some 30 miles farther north than it has ever been noted before. The Forest Service, United States Department of Agriculture, through the co-operation of residents in Maine, has discovered jack pine growing on an island in Lobster Lake, which lies just south of Moosehead Lake. This discovery extends the known range of the jack pine in Maine to a new northern limit.

The Fitchburg Paper Company, book paper makers of Fitchburg, Mass., have petitioned the Whitmore Manufacturing Company of Holyoke, Mass., papetrie manufacturers, into receivership. The court has appointed George Webster of the defendant company receiver in equity. Inasmuch as the company's assets are said to total more than the $280,000 claims of creditors the action was largely a precautionary one.

Brown & Co. of Portland, Me., and Berlin, N. H., have added to their acreage of swamp land in the Everglades of Florida, so that they now have a total of 75,000 acres altogether. This they will use in the growing of peanuts from which the oil will be extracted and combined with the waste hydrogen from the sulphite mill at Berlin, N. H., to manufacture a nationally known cooking fat.

The Glenwood Lumber Company of Portland, Me., has been incorporated under Maine laws to deal in pulpwood and other timber lands. The capital stock consists of 1,000 shares of no par common and $50,000 of preferred. Harry C. Libby of Portland is president, G. L. Burk is treasurer, and M. D. Keefe of Portland is the third director.

Great Northern Paper Co.'s power plant at Anson was completed late in December. It houses five 1,500 horsepower turbines, power being developed from a stream of 3,000 cubic feet of water per second. A dam 200 feet in length was built across the Kennebec. Power is furnished to the mill at Madison directly across the river.

Bird & Son, Inc., paper and roofing manufacturers, formally opened their new floor covering plant at East Walpole, Mass., as the old year drew to a close. The new plant has a capacity of 7,000 yard wide miles of floor covering yearly. The paper felt base is made at the company's Phillipsdale, R. I., plant.

Reports from northern New England give conditions excellent for the heavy cut of pulpwood that will be taken out of the forests, and for the steady operation of the mills. Great Northern Paper Co.'s big storage basin at Ripogenus Dam, which is a good indicator of general water conditions, is well filled. Snow has been exceedingly light so far.

No successor will be named for some time to the office of treasurer of the S. D. Warren Co., recently vacated by Herbert W. Mason, who left on January 1 to become affiliated with Dill J. Collins of Philadelphia.

It is reported that the Pine Waste Products Company, Inc., of Stamford, Conn., have purchased a site in Georgia which will be used for the construction of a new pulp and paper mill.

The Hollingsworth & Vose Paper Company have removed their offices in Boston to the Province Building, 333 Washington Street.

Northern New York

Watertown, N. Y., January 1, 1924.

Enlargement of Stillwater Reservoir Underway

Seventeen paper manufacturing companies of the Black River valley, with mills on the Black and Beaver rivers, will benefit materially by the enlargement of the Stillwater reservoir on the head waters of the Beaver—a project now being carried on by the board of the Black River regulating district, the first such board to be formed in New York State under the Machold law.

Work of lumbering and clearing the reservoir site is already under way, with the St. Regis Paper Company handling the timber contract. A contract has just been awarded to Scott Brothers Contracting Company, of Rochester, for building the dam and spillways for the reservoir, at a cost of $226,131. This portion of the reservoir must be completed by March 1, 1925, and the site will be free from timber by that date, so that the reservoir, with a capacity of 4.5 billion cubic feet, will be put to its full use that summer. The reservoir now being used contains when full only 1.8 billion cubic feet.

One million dollars will be the total cost of enlarging the reservoir, and this sum has been split among forty-six owners of power sites along the Beaver and Black Rivers.

Following are the paper companies assessed, with the sum alloted each: Dexter Sulphite Pulp & Paper Co., $12,096; Warren Parchment Company, $365; Brownville Board, $9,973; Brownville Paper Compnay, $8,993; Harmon Paper Company, $365; International Paper Company, $77,794; Taggart Brothers Company, $9,897; Knowlton Brothers, $3,442; Hinde & Dauch Co., $1,136; Sherman Paper Company, $40,944; National Paper Products Company, $3,054; Island Paper Company, Carthage, $2,776; West End Paper Company, $13,422; Champion Paper Company, $9,916; Carthage Sulphite Pulp & Paper Co., $6,765; J. P. Lewis Paper Company, $31,954; St. Regis Paper Company at Deferiet (power owner by Power Corporation of New York), $62,306.

The Bagley & Sewall Company at Watertown, makers of paper machines, is assessed for $7,270. These assessments are to be paid over a period of 50 years in annual installments.

Scandinavia Interested in New Grinder

Sale in the Scandinavian countries of the magazine grinder invented by John J. Warren, president of the Harmon Paper Company, of Brownville, and of the Warren Parchment Company of Dexter, and a vice-president of the St. Regis Paper Company, as a result of the recent visit here of Peter Larsen, representing the Lorentsen Wettre, a large Norwegian paper mill supply house located in Chrisiania; and F. Pytterud, of the Kveroner Bruk, also of Christiania. Mr. Larsen and Mr. Pytterud were enthusiastic about the Warren grinder, which they saw in operation at the Deferiet plant of the St. Regis Paper Company.

The Warren grinder has six features that render it superior to the old hydraulic grinder, it is claimed. They are: automatic control of the feed of wood into the magazine, assuring a practically uniform length of fibre; increase in the production of ground wood at lessened labor cost; decrease in power consumption per ton of pulp ground; better working conditions in the grinding room; accurate determination of the grinder's production for any given period.

The Bath Iron Works of Bath, Maine, are now manufacturing the Warren grinder for experimental use in paper mills. The grinder is designed primarily for wood four feet long, although split wood and saw mill slabs also can be handled. The wood is conveyed to the charging floor and into the top of the machine in the usual manner. After it is placed in the magazine four heavy chains of the thimble roller type, operating continuously the entire length of the machine, grip the

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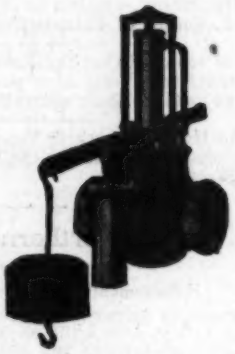

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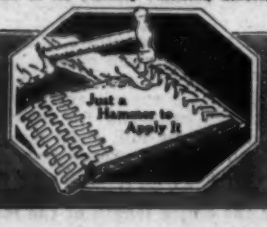

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wood, compact it and carry the column thus formed down the magazine under pressure, shoving it against the grinding element. The machine can be quickly and easily adjusted to allow for variations in the size of the grindstone, with the idea of keeping at all times the finger plates of the grinder as close to the grinding element as possible.

The strictly new features of the grinder are baffles forming part of the magazine and machined to operate within close limits between the housing and the magazine, to center the magazine over the grindstone and prevent the escape of steam generated by the grinding. This steam is useful in penetrating and softening blocks in the column of wood being ground. A spray is placed at the top of the magazine where the wood enters. The steam generated heats the descending water before it strikes the grinding surface, so that only hot water is applied directly to the grindstone during the operation, thus adding to the life of the stone.

Burring the stone is accomplished by a hydraulically turned stone truing lathe extending through the grinder's sides, the carriage of which can be run inside the housing whenever it is desired to dress the stone.

Pulp for newsprint can best be ground in the Warren machine at a consumption of between 40 and 45 horse power for each ton of air dry pulp, tests have shown.

Kinne-Lewthwaite Marriage Solemnized in Watertown

Clarence E. Kinne, secretary and chief engineer of the Bagley & Sewall company, widely known through the paper trade because of his connection with one of the largest manufacturers of paper machines in the world, was married in Watertown on December 10 to Mrs. Gertrude S. Lewthwaite, formerly of Oregon City, Oregon, where she was employed by the Crown Willamette Paper company. Both had been married before, Mrs. Kinne's first husband, William Lewthwaite, who died several years ago, having been employed by the Bagley & Sewall company and the Crown Willamette company as a draughtsman. They will live at Watertown.

The romance of Mr. and Mrs. Kinne had an interesting feature in that the bride was a stenographer for Bagley & Sewall before her marriage to Mr. Lewthwaite in 1901. She and Mr. Lewthwaite moved to Oregon immediately after their marriage. Mr. Kinne has visited Oregon several times on business journeys. He has also visited the Orient and France in the interests of Bagley & Sewall.

Owing to the lack of snow in the northern woods it is quite certain that the proposed demonstration of snow hauling of pulpwood will be postponed from December until late in January or early in February. The demonstration, however, will take place at Piercefield, as originally planned.

A lot of us lay up money for a rainy day and then allow ourselves to be fooled by the first sprinkling cart that turns the corner.

Pacific Coast News

Columbia River Mill Nearing Completion

The new Columbia River Paper Mills at Vancouver, Wash., where 300 men under an approximate payroll of $40,000 monthly, will be employed, is fast nearing completion.

The steel work for the superstructure is now in progress, all cement work, acid towers, vats and foundations now being put in place. A recent shipment of 260 tons of machinery, representing but one-quarter of the entire amount now designated for the new mills, contained a great paper making machine from Bagley & Sewell, N. Y., via Panama Canal. This machine, designed especially for the production of vegetable parchment, wrapping paper and newsprint, will turn out sheets 136 inches wide. Electrically driven, it will produce these sheets at the rate of 750 feet per minute. The total output will be fifty tons per day.

The sawmill, the waste of which is to be consumed in the new pulp and paper plant, is now cutting 125,000 feet of timber per day on eight-hour schedule. The sawmill is also electrically driven. Not an ounce of waste will be created ultimately, for the sawdust, bark and edging are going to feed the boilers of the paper plant and will be also used for generating power for all other needs of the paper mill and for the generation of a goodly portion of electrical energy of both sawmill and paper mill.

The new mill will be of steel frame and glass, with a three-foot tiling base, and will contain 22,000 square feet of glass. Construction work is being conducted under the supervision of H. H. Schwartz, of Cleveland, Ohio. Because of its unexcelled geographical situation, the Columbia Pulp and Paper Mills possess remarkable advantages for the sulphite process. Located conveniently near the logging districts, it possesses deep water front and rail shipping facilities.

At a recent meeting of stockholders the common stock was increased by $600,000, making the present total issue of common stock amount to $1,250,000. Three hundred seventy-five thousand dollars of the new issue is absorbed by stockholders and the remainder has been placed in reserve.

Great Paper Making Possibilities in Northwest

The Northwest is arousing marked attention as possessing great possibilities for the manufacture of paper. Though numerous paper mills are in operation, not a fraction of the great waste of mills and forests is being utilized in pulp and paper manufacture. The paper mills at present established in this wide scattered territory are the Crown-Willamette Paper Company, which is rated as second largest paper making firm in the world and which operates five mills; the Hawley Pulp & Paper Co., of Oregon City, recently destroyed by five but now to be rebuilt; Oregon Pulp & Paper Co., of Salem; Everett Pulp & Paper Co., of Everett, Wash.; Parafine Paper Company, of Sumner and Port Angeles, Wash.; Washington Pulp & Paper Company, of Port Angeles, Wash.; Cascade Paper Company, of Steilacoom, Wash.; Inland Empire Paper Company, of Spokane, Wash., and the Powell River Paper Company, Howe Sound Pulp & Paper Co., and Beaver Coal, Pulp & Paper Co., of British Columbia. Now the new Columbia River Paper Mills at Vancouver, Wash., and the still newer Portland Pulp & Paper Co. in Portland will add two more big, well-financed firms, both capitalized past the million-dollar mark, to the list.

And yet the possibilities for the future are still virgin. Near Eugene, Ore., an immense sawmill is cutting timber in an area of land covered by a fifth of the entire timber in the state of Oregon. Here flows the McKenzie river with power as great as all that which is utilized in the entire state of Oregon. The fact that local capital is now interesting itself in the two newest mills, now being erected, is prophetic for not too long waiting for the further development of these great natural resources.

Crown-Willamette to Build Two More Mills, Rumor

In their holdings near their logging camp at Astoria, Ore., the Crown-Willamette Paper Company has cleared away a tract at the base of Young's River Falls which will permit formation of a dam. This fact, together with the announcement of the Crown-Willamette that a power house with turbines and generators will be erected at this point for lighting and loading power, has been responsible for the assumption on the part of Astorians that the Crown-Willamette is to erect two small new mills, one for cut-up and one for pulp, at this point.

The floating of this rumor is based upon the fact that the Crown-Willamette has been compelled to class as waste spruce and hemlock logs less than twelve inches in diameter, and the two small mills rumored to be erected soon would eliminate the necessity for this waste. Barges would then convey the pulp to the paper mills at West Linn.

Many small sales of timber have been made recently in Clatsop county, which business men attribute to the agents of the Crown-Willamette. J. J. Seid, traffic manager of the Crown-Willamette Paper Co., and the Willamette Transportation & Towing Co., recently visited Portland, where he held conference with Crown-Willamette officials and railway traffic managers.

A motion picture educational film showing how paper is manufactured from the raw material until it is delivered as newsprint to the big city dailies, was recently given in private performance to the Portland Advertising Club by E. K. Stanton, head of the research department of the Crown-Willamette Paper Company, and O. W. Mielke, of the Blake, McFall Co.

Hawley Paper Co. Granted Petition

After a long-drawn-out civic controversy, the city council of Oregon City, Ore., finally granted the petition of the Hawley Pulp & Paper Co., bearing the names of 900 property owners, to condemn the stub end of Third street, so that the new Hawley plant may be erected with the highest degree of efficiency.

The Hawley Pulp & Paper Co.'s plant was practically destroyed by fire on the night of October 8th. For some time there was some doubt as to whether the new mill that would rise in its place would be located in Oregon City or

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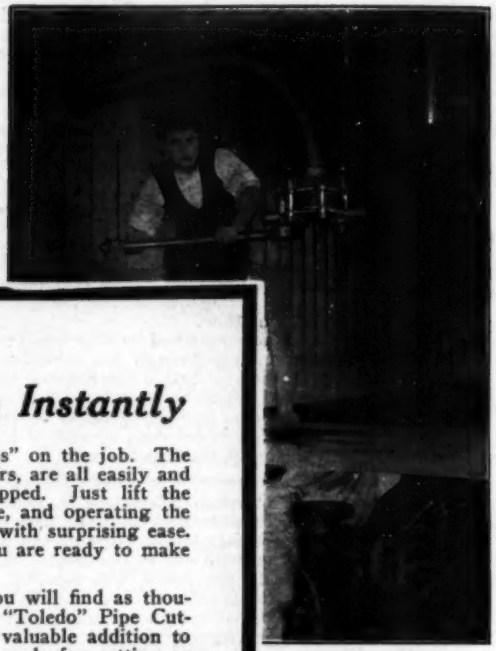

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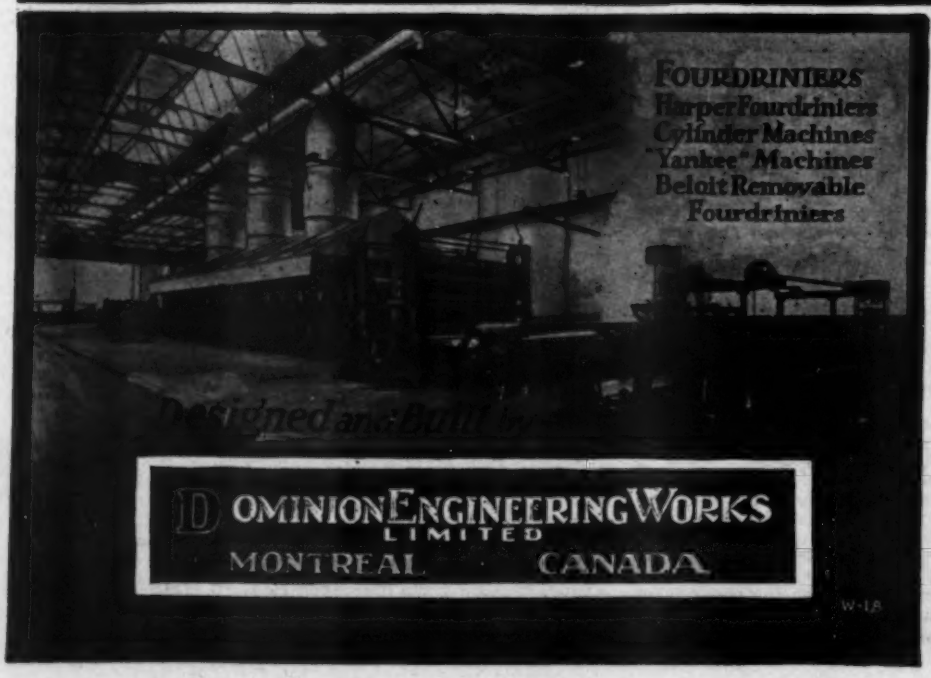

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English Reels.

not until the company finally decided that if the end of Third street were vacated by the city a favorable decision would be rendered. A bitter controversy arose with the Oregon City Woolen Mills as chief complainant, but after a long battle in which the entire populace of Oregon City became involved, the decision was finally rendered in favor of the Hawley people. Within the very near future plans will be drawn up for the new plant which will be built at an investment of $1,200,000.

Plans are being made for the construction of a $1,500,000 paper plant for the National Paper Products Company, affiliated with the Zellerbach Paper Company, 220 South Los Angeles St., Los Angeles, Calif. The plant will include machine shop, power house and auxiliary structures.

Construction work has now commenced on the new $1,500,000 plant of the Portland Pulp & Paper Co., near the Monarch sawmill, Portland, Ore. R. H. Mills and Joseph Kaster, president and vice-president, are placing orders in the East and South.

It is reported that a new paper mill for manufacturing paper bags is to be erected in Los Angeles, Calif., at 3342 East 42nd St., by W. P., Sr., and F. L. Taylor. No other information is obtainable at this time.

George Randolph Hearst, of San Francisco, son of William Randolph Hearst, recently visited the principal paper making plants of the Northwest.

The Pioneer Paper Company are planning the construction of a $50,000 addition to their plant at 247 South Los Angeles St., Los Angeles, Calif.

With water at normal height all grinder mills at Oregon City are now in operation.

Pulpwood Study in the South

A study of the yields obtained from the southern yellow pine for pulp is now under way through the co-operation of the Great Southern Lumber Company with the Southern Forest Experiment Station. Cutting has been done according to different methods on a block of 200 acres. All seed trees and immature timber adjacent to the plots on which this study is being carried out have been tagged, mapped, and described in order to get the increased rate of growth on these trees which will follow the cutting operations. It is planned to remeasure these plots again in about five years.

A serious infestation of forest insects near Laurel, Miss., has been reported by the Southern Forest Experiment Station. A naval stores company located at this point has been losing timber for some time and this year the loss has been very heavy. Most of this has been caused by two groups of bark beetles, Dendroctonus and Ips. An insect infestation on a large scale appears possible in many parts of the South.

The Florida Paper Mills Company will start actual building operations soon at their location in South Jacksonville, Fla. H. J. Ferren, engineer of the company is busy with plans and the preliminary construction work. Already the company has about $100,000 worth of machinery stored at the location of their plant and are expecting more to arrive soon. This plant will manufacture paper from Florida saw grass and will cost about $250,000.

A $1,000,000 paper and board mill is to be constructed by the Bogalusa Paper Company of Bogalusa, La., of whom W. H. Sullivan is one of the officials in charge. This plant will be equipped for a capacity of about 75 tons per day of chip board and other paper products, used for the manufacture of containers.

Authorization for the immediate construction of their mill, which was destroyed by fire on December 17, with an estimated loss of $130,000, including equipment, has been given by the Lindley Box and Paper Company of Marion, Ind., of whom L. R. Lindley is president. The new building will be larger than their former plant and additional machinery will be installed.

The former property of the Commercial Distillery Company of Terre Haute, Ind., which included 35 acres of land, has been acquired by the Terre Haute Paper Company, of whom W. G. Clark is general manager, who will use this new site for extensions to their two local mills.

Plans were made by the Minnesota and Ontario Paper Company of International Falls, Minn., to place a 114 inch trim machine on Kraft paper, January 1st. They intend to make strictly No. 1 paper only. The sales will be handled out of their Chicago office at 737 Conway Bldg. Arthur R. Rapp will have charge of the sales.

Plans are completed for the building of a 2-story and basement paper mill, 500 by 200 feet in dimensions, by the Old Hickory Powder Plant of Old Hickory, Tenn. Kraft paper will be manufactured exclusively by this new unit. R. J. Pullen is general superintendent.

The Hinde & Dauch Paper Company of Muncie, Ind., are planning to rebuild the portion of their plant which was destroyed by fire on December 17, and which caused an estimated loss of $60,000.

Canadian News

Quebec, January 1, 1924.

The embargo on pulpwood is still the topic of the day and comments are still flowing in the Canadian press. Public opinion, however, is not warming towards the government's pulpwood commission. Some irreducible protagonists of an embargo on pulpwood are still very active in their propaganda and aggressive in their arguments. One of them, Mr. Frank J. D. Barnjum, has taken a decisive stand during the last two federal by-elections of Halifax, in Nova Scotia, and Kent in New Brunswick. Although he claims to be a staunch liberal, he has issued a strong appeal to the elections of these two counties to cast their vote against the liberal candidates. In a full newspaper page published in the Halifax Herald, Mr. Barnjum attacks bitterly the government and ridicules the personnel of the commission who was not such as to draw forth any confidence in the real value of their findings. Mr. Barnjum's denunciations have had some weight in the results of the two elections.

Canadian Pulp & Paper Association to Meet

The Canadian Pulp and Paper Association will hold its annual convention at the Rotel Ritz, Montreal, on January 23, 24 and 25.

Many interesting and vital topics will be discussed at this meeting, among them being the question of apprenticeship in the paper industry. A scheme of this topic has been drafted by Secretary W. G. MacNaughton of the Joint Committee on Apprenticeship, representing the Canadian Technical Section, the Superintendents' Association and the Technical Association. There is to be a meeting on this subject on January 24, and the details will be fully explained. More is mentioned of this plan on another page of this issue.

It is reported that what will be known as the president's dinner will take the place of the usual annual banquet.

American firms interested in Canadian pulpwood are active in securing long-term contracts with Canadian producers, and one of them is reported from Campbellton, N. B., where the O. J. Klein Transportations Company has signed a ten-year contract with American mills in the vicinity of Watertown and Carthage for 36,000 cords annually. Other contracts have also been awarded. The Canadian producers of pulpwood for export have felt safe in entering these contracts, but the recent electoral reverse may bring a change in the policy of the government, should the liberal government be defeated at the next general elections. Its majority in the house is very small and in the hands of the progressives; he may be defeated in the house and forced to go to the country before the life of the present parliament has expired.

News Personals

John J. Spinnelli, for the past five years with Atterbury & McKelvey, Inc., of New York, has severed his connections with that firm and has entered business under his own name with offices in the Park Row Building, 15 Park Row, New York, where he will deal in waste paper, rag stock and other paper manufacturers' supplies.

Mr. Harry Williamson, formerly of the Northwest Paper Company of Cloquet, Minn., and who is now with the Bastrop Pulp and Paper Mill of Bastrop, La., writes: "Have been awfully busy these last few months starting up and running the new Beloit machine making high speed Kraft out of

FOR SALE

4—Type A Cox Stokers, 7 ft. 8½ in. wide, 9 ft. long. (Never used.)
3—Type B Cox Stokers, 9 ft. 8½ in. wide, 11 ft. long. (Two used three months, one never used.) Manufactured by the Combustion Engineering Company. Standard equipment for hard coal. Fit any boilers approximately their size. Excellent complete equipments. (Type A's without drives; Type B's with 1½ H. P., D. C. Motors.) For immediate delivery and at very attractive prices.

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They increase production, save labor and decrease wastage on Calenders. Write for literature. Special Machinery—Couplings—Gears.

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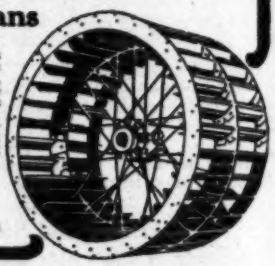
Next to efficiency, economical operation and durability are the most important requirements of any mechanical ventilation system.

Bayley Plexiform Fans

meet all of these requirements and are in addition designed to occupy a minimum of space. Light, yet sturdy and durable, easy running, moving the greatest volume of air with low power and upkeep costs are a few Bayley Plexiform features. Made in various sizes, either single or double mounts, with outlets in any desired position, for engine motor or lineshaft drive.



Write for Booklet.

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20 Per Cent Saving in Steam Guaranteed

The STICKLE COMPOUND CONDENSING SYSTEM and AUTOMATIC STEAM CONTROL for Paper Machines is **guaranteed** to save you 20 per cent in steam consumed for this purpose.

Our folder entitled "How to Dry Paper"—showing our Compound Condensing System for draining the dryers and heating the air with the discharge from the dryers to condition the machine room should interest you.

Send for this folder to-day

Stickle Steam Specialties Company
Indianapolis, Ind.
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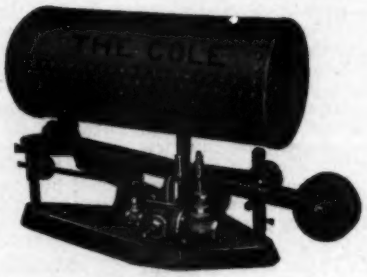

DON'T SPEND A NICKEL

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The Cole System

of handling Steam Condensation

For Storage Heaters, Drying Coils, Pumps and Power Plant Specialties Write

THE GRANT E. COLE COMPANY
21 River St. TORONTO CANADA

Southern pine. The machine with its patent removable Fourdrinier is a beauty and I think after a little more experience in preparing the excessively long fiber of this pine wood, a class of Kraft will be turned out equal to anything on the market."

H. L. Newell

Following a stroke of apoplexy, H. L. Newell, president of the American Envelope Company, West Carrollton, O., died at the Miami Valley Hospital, Dayton, at 11 o'clock Tuesday evening, January 1, at the age of 70 years.

His death occurred suddenly as he was recovering from an operation at the hospital several weeks ago. He had apparently regained his strength and had been told that he would be able to return to his home in a few days, when he was seized with apoplexy.

Mr. Newell is survived by his widow and three children. He was widely known by paper manufacturers throughout the country.

Brayton R. Clark

Brayton R. Clark, treasurer and for many years acting head of the Malone Paper Company, manufacturers with mill in Malone, N. Y., died on December 27 at his home in Malone of heart disease. Mr. Clark was an official of several important corporations in Malone, and was president of Malone Village from 1908 to 1912.

Gustave Lindenmeyr

Gustave Lindenmeyr, who died on December 27 in Pasadena, Cal., was head of the paper jobbing firm of Henry Lindenmeyr & Son, of New York City, having been its president for more than 30 years. Mr. Lindenmeyr was also a director of the Commonwealth Bank in New York, and was 64 years old. He resided at 11 West Eighty-first street, New York.

A. H. Searle announces the opening of an office at 132 Nassau street, New York, where he will conduct a general business in papermakers' supplies, and represent in the United States in the sale of papermaking rags, the firms of G. Wallace & Co., Dundee, Scotland; Mayer Bros., Hanover, Germany, and I. & J. Hyman, London, England.

C. A. Wadsworth, who has been connected for several years with H. B. Wadsworth, has resigned from H. B. Wadsworth, Inc., of 51 East Forty-second street, New York, and has opened his own office at 342 Madison avenue, New York, for the sale of wood pulp and a general line of mill supplies.

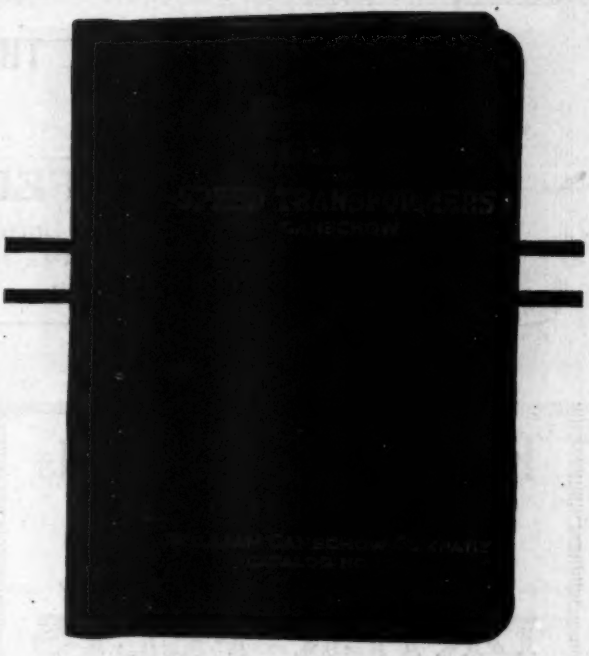
Finds Poor Color Match in White Papers

Paper that is supposed to be white is rarely altogether so. There is nearly always some tint to it, and manufacturers and users often experience considerable difficulty in obtaining a satisfactory match between paper of two different lots. In order to be truly white the paper would have to reflect equal proportions of all colors when viewed by daylight, but in nearly all cases there is some one or more colors which are not reflected as well as the others are. Measurements of such tints were made at the Bureau of Standards, Department of Commerce, the method used consisting in the determination of the relative amounts of blue, green, and red light reflected from twenty-one samples of commercial papers when viewed by daylight. These samples were collected from various sources and included newsprint, printing, book, writing, bond, and ledger papers.

Out of the twenty-one, only two were found to be nearly white, the others being quite deficient in blue and less so in green. In order to overcome this difficulty it is often customary in paper mills to add a blue dye to the finish in the beater.

The attempt was also made to match the samples for color with the unaided eye, observations being made by seventeen individuals experienced in color work. There was practically no agreement among the seventeen as to the whiteness of the papers, which would seem to be an effective argument for the employment of some method more accurate than the unaided eye in the color grading of white papers.

These tests are described and the results given in Technologic Paper No. 244 of the Bureau of Standards entiled "A Measure of the Color Characteristics of White Paper." Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C. The price is 5 cents.



The new Ganschow Handbook Catalog No. 100 is nearly ready for distribution.

It is a complete treatise on cut gearing of all kinds and contains a large section on Speed Transformers, as well as many pages of engineering data. This complete collection of data fills a long-felt need among gear users. There should be a copy on your desk.

It contains over three hundred pages of real information.

Ganschow

If you are a user of Gears or Speed Transformers you will find this book useful in designing and purchasing any equipment of that sort.

We'll be glad to send a copy to manufacturing and power plant executives. Just fill in the coupon below, attach to your letterhead and mail.

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Top and Bottom Wet Felts for board machines, with all the qualities requisite to insure long life and continuous production.

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ESTABLISHED 1844
FITCHBURG, MASS.
MANUFACTURERS OF
STANDARD AND MULTIPLE PLY
DRYER FELTS
English Weave in Two, Three, Four, Five and Six Ply—60 Inches to 176 Inches in Width

Fine Faced Felts for Fine Papers. Absolutely no felt marks in paper. TRIUNE Three Ply Felts for Coarse Papers.

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EXCLUSIVE MAKERS OF
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Have You Run Them?
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Are You Interested in Accurate Running Felts?

Give Us a Trial
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Our Cylinder Wet Felts for 9 points straw and for roofing are *open* in texture, *do not* stretch and *are durable*. A trial is invited.

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THAT ARE SNAPPY BUT NOT SOFT
ARE THE KIND TO USE FOR PAPER MACHINES

MADE BY
STOWE & WOODWARD COMPANY
The Rubber Roll Makers NEWTON UPPER FALLS, MASS.

N. Y. Forestry Students Find Work Interesting

A few days before Christmas we received an unique greeting card from the New York State College of Forestry, Syracuse University, Syracuse, N. Y. The card was a sample of hand-made paper by the junior students in pulp and paper manufacture at the college. It was 7x8¾ inches in size and presented a green mottled appearance, which was caused by mixing in a percentage of unbleached sulphite fibers which had been dyed green.

The students at the College of Forestry are taking a great interest in their work, as is shown by the following extracts of a letter received from Harry E. Weston, professor of pulp and paper manufacture there:

"All of the boys who took part in the manufacture of these hand sheets had a lot of fun out of it. Some of them, in fact, took such interest that the time they spent in the laboratory was not based at all on class room requirements. They simply spent any available time which they could find to do the work and I feel that such effort as they put into the work will mean very much in the building up of a successful professional spirit after they leave college. They begin to realize that a day's work is not simply the number of hours laid down by a college institution or plant.

"This work was done in our course designated as Pulp and Paper Manufacture II+—Technology Laboratory. The course is devoted to laboratory demonstrations of the principles involved in the various pulp making processes as well as in paper making.

"The Christmas greetings were manufactured entirely from sulphite pulp stock, the mottled appearance being obtained from the use of unbleached sulphite fibers which had been dyed green. These sheets were turned out on hand frames of the same size as the greetings on both laid and wove hand molds. At present we have approximately 40 students at the college who are specializing in pulp and paper manufacture. Of course, as you realize, we are giving four years of work in this special field which leads to a degree of Bachelor of Science."

Woodlands Section Begins Forestry Calculation Service

O. M. Porter, secretary of the Woodlands Section of the American Paper and Pulp Association, has announced the inauguration of a consulting forestry service for paper and pulp mills by the Section in line with the Section's policy of "encouraging the practice of forestry on the timberland holdings of the pulp and paper industry." Returns on the timberland investments of the paper industry can be assured only where these lands are adequately protected from fire and so logged as to provide for a second cut or a reasonable resale value. It is to meet this situation that the Woodlands Section is offering the consulting service to members of the American Paper and Pulp Association, along the lines of timber land examination and formulation of management, fire prevention and reforestation plans.

The proper handling of timber lands, says the Woodlands Section announcement, can be assured only by the service of trained, practical foresters. Many companies have not yet realized the necessity of employing foresters in the management of their timber land holdings; others on insufficient lands to warrant the employment of a full-time forester; and others may be contemplating the purchase of timber lands or actual management operations on those lands which they already own. It is for such companies that the new service is offered.

The service will be given at cost, but the Woodlands Section would expect to be reimbursed for actual traveling expenses only, with a reasonable fee for the services of Mr. Porter, who is a technically trained forester.

Equipment Men Adopt Code of Ethics

The organized manufacturers of chemical equipment and accessories have just defined in a formal document fair and unfair business practices, as these affect their dealings with the chemical and chemically controlled industries.

This document is now the Code of Ethics of the Chemical Equipment Association. It was recently adopted by an overwhelming majority of the active membership of the association, and is regarded as having great significance with respect to all dealings involving essential equipment and accessories.

The code is the result, according to the association, of an effort to define fairness in business practice in such a way that the interests of both buyer and seller may be protected. Equipment manufacturers have long felt that certain practices have been countenanced by custom, which a fair-minded

Cleveland Worm Gear Reduction Unit applied to pulp thickeners. Motor 2 H. P. at 880 R. P. M. Ratio in worm drive 32 to 1.

Dependable, Uniform Transmission of Power

If you are interested in dependable, uniform transmission of power write us.

There are some interesting facts concerning Cleveland Worm Gear Speed Reduction Units that you should have as a matter of good business.

The uniform flow of torque that is an inherent quality in our product does wonders to lower repair costs of all connected machinery. It increases the life of bearings, gears and other parts.

The freedom from vibration that is fundamental with Cleveland Worm Gear Drives meets the unqualified approval of factory chief as well as shop men. "Cleveland Dependability" is an axiom in plants where they are used.

Many plants are finding the open type of gearing too costly to maintain.

Do you know that Cleveland Worm Gear Drives are completely enclosed and protected from the elements as well as against dust, etc.?

When it comes to low maintenance costs of both drives and connected machinery the facts at our command will interest you.

Write for further information and indicate the type of service and give power data for which drive is desired. This will assist us in giving you precise information.

The Cleveland Worm & Gear Co.

America's Worm Gear Specialists

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WORM GEAR
REDUCTION UNITS

The Sandy Hill Iron & Brass Works

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Manufacturers of **Paper and Pulp Mill Machinery**

FOURDRINIER WIRES

Dandy Rolls *Cylinder Molds*
Brass, Copper and Iron Cloth
Bank and Office Railings

WIRE SIGNS

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Established 1842 SPRINGFIELD, MASS.

examination of the facts would plainly establish as abuses against the seller. They have also been cognizant of the purchasers' right to have certain habits of trade, and protective practices, given general recognition.

With these two main considerations in mind, the association entrusted the formulation of a Code of Ethics a number of months ago, to a committee which undertook a considerable investigation of current business practices, the final result of which is the code now officially adopted by the organization.

Big Production of Paper in 1923

"Although the production of paper in the few weeks preceding the annual inventory period is not likely to be large, it is now evident that the volume of paper production in the past year has been high," says the market review in the PAPER AND PULP INDUSTRY, the monthly publication of the American Paper and Pulp Association, which adds, "When final figures are available it may be found that the volume is nearly or quite equal to that of any preceding year.

"With a prospect for generally good business throughout the coming year in all industry, the paper manufacturers should expect an increasing demand after the first of the year both to replenish stocks, and to meet current demand. There are no basic business conditions which warrant any pessimistic sentiment as to the coming months.

"The American Paper and Pulp Association figures on production show that October production was about 12 per cent higher than in September, and in some grades back to the high figures of June. Fine papers have been continuing active and holiday sales have not been without a good effect on the wrapping paper group. The percentage of return from sales may have been smaller during 1923 owing to sharper competition than was experienced in 1920, but no industry can be considered in an unprosperous condition when sales of its product are near to the high record."

The American Steam Pump Company, of Battle Creek, Mich., has purchased the plant, assets and entire business of the Advance Pump & Compressor Company of that city. The officers of the American Steam Pump Company will remain the same as in the past: Richard R. Hicks, president and treasurer, John W. Bailey, vice-president, Walter R. Munn, secretary and traffic manager; Arthur Greene, assistant treasurer, and M. C. Abbey, superintendent. The staff includes Edwin H. Davis, M. E., Karl G. Sommer, M. E., C. R. Davis, advertising and sales, and C. N. Forsythe, purchasing agent.

Westinghouse and Japanese Electrical Interests Form New Company

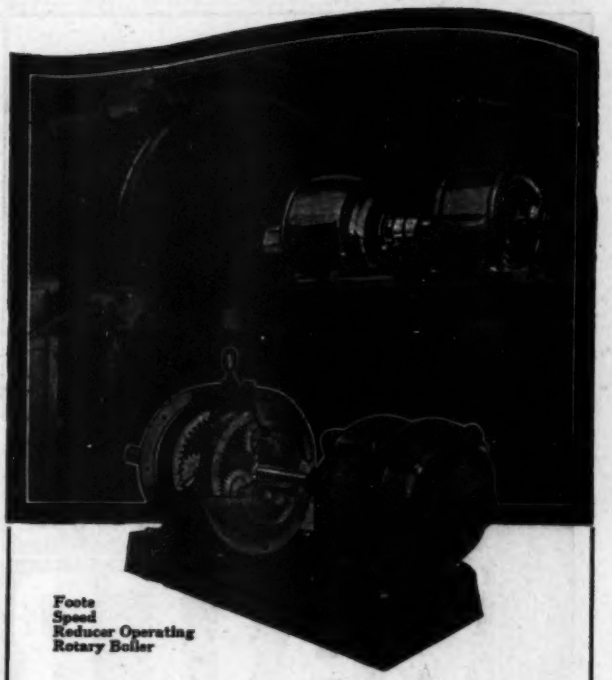
The report of an arrangement between Westinghouse and Japanese electrical interests for the formation of a Japanese electrical manufacturing company has been confirmed by cables received by the Westinghouse Electric International Company from General Guy E. Tripp, chairman of the Westinghouse board and L. A. Osborne, president of the Westinghouse International Company, who are now in the Orient.

"The new company is known as the Mitsubishi Denki Kabushiki Kaisha, or in English, the Mitsubishi Electric Manufacturing Company," states E. D. Kilburn, vice-president and general manager of the Westinghouse Electric International Company, New York. "I assume that the reported capitalization, 15,000,000 yen or $7,500,000 is correct, although word on this point has not been received.

"The reasons for the formation of this company are as follows: The Westinghouse Company has for many years been engaged in promoting the use of electricity in Japan, and its efforts have met with so favorable a reception that Japanese electrical development, including railroad electrification, the use of water power, the installation of large steam generating plants, and the formation of super-power systems—compares favorably with that in the United States.

"As a consequence of this rapid development, electrical apparatus has become one of Japan's largest imports, and since Japan's principle exports, silk, copper and objects of art, cannot be expanded by a corresponding degree, the Japanese began to feel that there was danger of a continuing unfavorable balance of trade. Hence it seemed wise to Japanese interests to begin the manufacture of electric machinery and supplies in their own country.

"In pursuance of this policy, the important Mitsubishi interests which are engaged in banking, shipbuilding and steel making approached the Westinghouse Electric Company with a proposal for a co-operative agreement, whereby the West-



Foote Speed Reducer Operating Rotary Boiler

Foremost Engineers Approve

FOOTE SPEED REDUCER

Engineering and Construction

WHEN the engineers of such companies as Ford Motor Co., Snoqualmie Falls Lumber Co., Indiana Portland Cement, Atlantic Elevator, Republic Chemical Co., Durant Motors, and innumerable others equally well known choose Foote Speed Reducers it is a high recommendation. It assures you that when you make Foote Speed Reducers your choice for reducing the speed and transmitting the power to your conveyors, mixers, agitators, etc., you are choosing wisely.

Foote Speed Reducers replace belting, chains, open gearing—creating greater production efficiency and worth while economy.

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Mfrs. of rawhide and bakelite micarta pinions and cut gears of all kinds.

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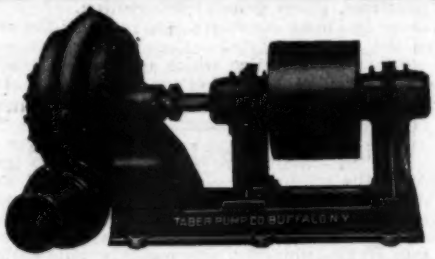
KING & KNIGHT, Underwood Bldg., San Francisco, Cal.

Pickles' Patent
Automatic Steam Regulator
FOR
Paper Making Machines

Which absolutely control the drying of the sheet. Installed on sixty days' trial

W. F. PICKLES **Buckland, Conn.**

Another Massive TABER CENTRIFUGAL PUMP



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"Pump Specialists"
Builders of Centrifugal and Rotary Pumps

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WATER
PURIFICATION SYSTEMS
SOFTENING & FILTRATION
FOR BOILER FEED AND
ALL INDUSTRIAL USES
WM. B. SCAIFE & SONS CO., PITTSBURGH, PA.

These Mills Unload and Store Their Coal for 5 Cents a Ton—What Is It Costing You?

Three to seven cents is the power and labor cost of handling coal with the **Godfrey Conveyor**—depending upon the distance carried—and one man does all the work. A large number of paper and pulp mills throughout the country have installed this time, labor and money saving equipment. Ask them to tell you about it. We'll gladly let you know who has the **Godfrey** nearest you. Write for complete information. Ask for Bulletin A-1.

GODFREY CONVEYOR COMPANY
ELKHART, INDIANA

Pittsburgh, 601 Columbia Bank Bldg. **Philadelphia, 736 Drexel Bldg.**

inghouse Company was to supply technical skill and experience to a Japanese manufacturing company.

"The Mitsubishi Electric Manufacturing Company is the outcome of these negotiations. The Japanese profit by the arrangement because of the employment it will give to Japanese workmen and the improvement in their foreign trade situation, while the Westinghouse Company profits by receiving a continuous revenue for service and royalties in lieu of exports, that it was certain to lose within a comparatively few years. The United States profits because if the Westinghouse Company had not accepted this proposal, it is possible that a German firm would have been considered by the Mitsubishi organization.

"The Westinghouse Company has subscribed for a portion of the stock of the Japanese Company.

"A third party to this agreement is Takata and Company, the well-known Japanese importers with offices in New York City. This concern, which is the Japanese agent of the Westinghouse Company, will play a large part as distributor for the Mitsubishi Electric Manufacturing Company, and will also continue to import such Westinghouse products, as will be supplied from America.

New Catalogs, Booklets, Etc.

Unique Method in Advertising

The Strathmore Paper Company of Mittineague, Mass., have compiled a series of booklets which they have employed to get the message of Strathmore quality paper before the business man in a unique and forceful way.

The series is composed of eight booklets, 9x11½ inches in size and printed on a handsome paper of their own make. Each booklet is directed to a different class of trade and deals solely with the problem of the class to which it is directed. For instance; booklet No. 1 is entitled "The Strathmore Men's Shop," and is devoted to the paper requirements of this class of trade. Booklet No. 2 is "The Strathmore Bank," and is directed to banks alone, and so on through the whole series. Following are titles of the other booklets of this series, in order as they are issued: "The Strathmore Woman's Shop," "The Strathmore Jewelers," "The Strathmore Inn," "The Strathmore Furniture Galleries," "The Strathmore Construction Co.," and "Strathmore Motor Cars."

A pamphlet entitled "Trade Standards Adopted by the Compressed Air Society" has just been published, embodying the result of extended study and research on the part of the executives and engineers associated with the members of that organization. It embraces the nomenclature and terminology relating to air compressors and their operations.

In a pamphlet entitled, "Efficiency Tests of De Laval Motor Driven Pumps," the De Laval Steam Turbine Co., Trenton, N. J., publishes the results of efficiency tests upon several large units installed in municipal water works plants. The booklet also contains illustrations of their motor driven pumps.

"Oil Burning under Steam Boilers" is the title of a new catalog issued by The Engineer Company, 17 Battery Place, New York City. In this book are discussed the merits of the flat flame checker work type of burner, the mechanical burner using air registers and a new system known as the SAR, which comprises a steam atomizing burner throwing a hollow cone spray, used in operation under about 50,000 H. P. of boilers and has attracted favorable comment from engineers interested in liquid fuel. In the book also are included a number of typical settings which have proven successful in actual operation.

New Edition on Brown Hoist Cranes

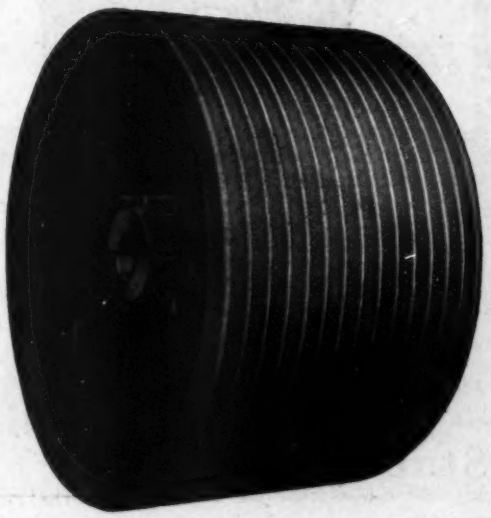
The Brown Hoisting Machinery Co., of Cleveland, O., have published the second edition of their booklet entitled "Man-Power Multiplied." This is more complete and much larger than the first one which was distributed in 1921.

The booklet is 8½x11 inches in size and is handsomely edited. Their locomotive crane No. 2, equipped with railroad truck or creeper truck mounting, is described in an interesting manner. The pages are full of photographs and illustrations of this crane at work under varied conditions.

Stephens-Adams Issues New Booklet

"The Labor Saver" is the title of a very instructive booklet published by the Stephens-Adamson Manufacturing Co., of Aurora, Ill. This booklet, size 6"x9", is a descriptive text of the methods that various companies have installed to save labor through the employment of Stephens-Adamson labor

Ultimate Economy



IN

POWER TRANSMISSION MACHINERY is not determined by the purchase price alone; but is arrived at, by dividing the purchase price by the number of years of continuous and uninterrupted service the Transmission Machinery gives you.

Our appliances are so designed and constructed that the length of service they render is measured only by the life of the plant in which they are installed. Even then they ofttimes may be transferred to other fields of usefulness, so that their final cost is so small as to be almost nil.

May we send you our catalog?

It contains some interesting and useful data on POWER TRANSMISSION APPLIANCES and the problems which beset the user.

T. B. WOOD'S SONS CO.
CHAMBERSBURG, PA.

POWER TRANSMITTING MACHINERY

"HALLOWELL"
Steel Lift Truck Platform

The "Hallowell' Runners are constructed of heavy angle steel to which are attached steel leg holders of a special and substantial design. These parts are joined by large rivets, hydraulically driven, a method which prevents any possibility of their working loose.

This detail of construction is of vast importance as unless the legs are rigidly and permanently attached to the runners they will gradually become wobbly and unreliable, occasionally collapsing.

The "Hallowell" joints remain tight—they cannot do otherwise.
This and other features, along with its low initial cost, combine to make the "Hallowell" a very interesting proposition.

Manufactured by

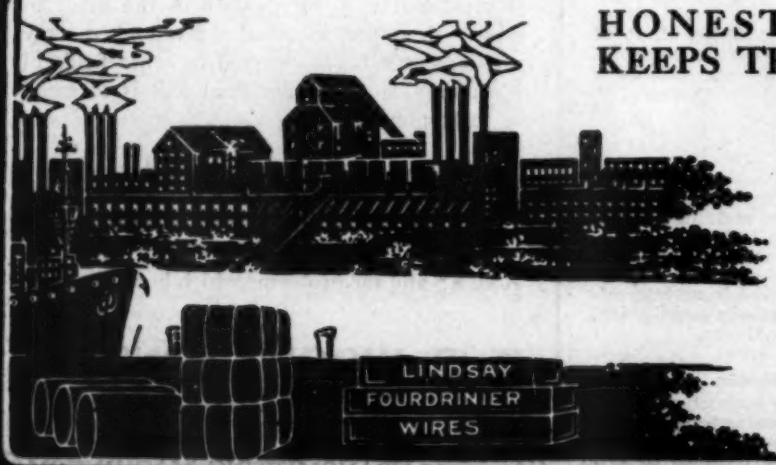
Standard Pressed Steel Co., Jenkintown, Pa.

The "Pioneer" Steel Hanger people

Real Merit Placed

Lindsay Fourdrinier Wires

In Many Mills



HONEST SERVICE KEEPS THEM THERE

They are ready to serve you

The Lindsay Wire Weaving Company

Collinwood Sta., Cleveland, Ohio

"Ask any Papermaker"

saving machinery, in which includes belt conveyors, coal crushers, ash hoists, bucket conveyors, stokers, etc. The booklet is illustrated by many photographs of their equipment, at work and idle, and blue prints of installations.

The Link Belt Company of Chicago have issued a new book, known as No. 660, on chain and chain application. This book illustrates and describes the various types and classes of chain used in the paper industry. It also briefly covers such equipment as the electric hoist, locomotive and crawler cranes, belts, conveyors, coal handling equipment, log stackers, sprockets, clutches, etc. Each subject is illustrated and described

Pulverized coal is the subject discussed in three booklets recently received from the Fuller-Lehigh Company of Fullerton, Pa. These booklets give full information on Fuller-Lehigh equipment, including coal pulverizers, driers, crushers, burners, conveying systems, fuel oil systems, transport system and engineering services.

The Philadelphia sales office of the Swenson Evaporator Company, formerly located at 1309 Weidner building, has been moved to 1228 Spruce street. The office is in charge of Mr. P. B. Sadtler, chemical engineer, who is assisted by Mr. H. B. Caldwell. The New York sales office is located at 136 Liberty street.

The new 72-page catalog issued by the De Laval Steam Turbine Co., Trenton, N. J., exhibits the marked development which has occurred in the improvement of centrifugal pumps, as well as in the direction of larger size and wider use. It contains many illustrations and information concerning their centrifugal pumps.

The new high speed type Francke flexible coupling for geared turbine and for high speed motor drives and the new pressed steel type for little auxiliary drives, as well as other data on flexible couplings, are described in Bulletin No. 37 issued by Smith & Serrell, Central Ave. at Halsey St., Newark N. J.

"Goulds Pumps" is the name of a compilation of bulletins Nos. 100 to 125 of the Goulds Manufacturing Company of Senaca Falls, N. Y. Each of these bulletins deals with a different style pump and contain complete information and photographs of every pump described.

The American Writing Paper Company of Holyoke, Mass., have started a new house organ entitled "Eagle-A News." It is mimeographed on 8½"x11" paper and contains general and personal news of the American Writing Paper Company's mills.

Silver saws, saw tools, saw specialties, machine knives, grinding wheels, metal cutting machinery, etc., are fully described in the new 268 page illustrative general catalog No. 19, of the E. C. Atkins & Company of Indianapolis, Ind.

The Hanna Engineering Works of Chicago, Ill., have gotten out an attractive catalog on their air hoists. Complete description is given, together with numerous illustrations of their hoists and blue prints of the working parts.

The Combustion Engineering Corporation, Broad Street, New York City, have published a four page pamphlet on the new Frederick stoker, in which they describe and illustrate the features of this stoker.

Paper making chemicals are listed and described in a new booklet issued by the Kalbfleisch Corporation, 200 Fifth Ave., New York City.

The Taber Pump Company of Buffalo, N. Y., have issued a 4-page circular describing their Taber boiler compound feeder.

J. E. Rhoads & Son of Philadelphia, Pa., manufacturers of leather belting, have opened a store in Atlanta, Ga., at 68 So. Forsyth Street. Here they will carry their Tannate flat and round belting, Tannate lace leather and belt accessories. This will put them in a better position to serve their many patrons through the south.

The Reading Paper Mills, Reading, Pa., have opened a branch sales office in New York City in the Canadian Pacific Building, 342 Madison avenue, with Edwin D. Peck in charge.

STEEL
for Immediate Shipment from Stock

For Maintenance, Construction and Repairs

Bars	Boiler Tubes
Shapes	Boiler Fittings
Structurals	Corrugated Sheets
Rails	Concrete Reinforcing
Plates	Welding Rods
Sheets	Babbitt Metal
Rivets	Tool Steel
Bolts	Bar Iron
Nails	Refined Iron
Wire	Floor Plates
Chain	Safety Treads
Turnbuckles	Small Tools
Shafting	Machine Tools, etc.

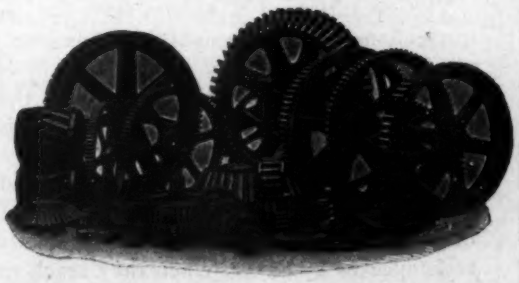
Write for the Ryerson Journal and Stock List —the "Key" to Immediate Steel

JOSEPH T. RYERSON & SON Inc.
CHICAGO CINCINNATI BUFFALO
ST LOUIS DETROIT NEW YORK

Machine Molded Gears

All Kinds, Types and Sizes

16,000 different fixtures to select from thus saving pattern cost

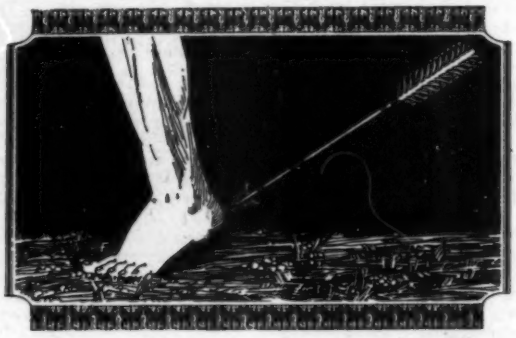


We have the most complete selection of Cast Gears of any manufacturer—Not a theoretical compilation, but patterns that are actually on hand ready for use.

Our Catalog will aid in your Gear problems

Poole Engineering & Machine Co.
BALTIMORE, MD.

Have you an "Achilles Heel?"



LITERALLY immune to physical injury, Achilles nevertheless lost his life because of one vulnerable spot.

Good though his mother's intentions were, 'twas all for naught because she did not think of his unprotected heel.

In the paper mill, where untold effort and immense sums of money are invested in equipment, does it pay to jeopardize profits by purchasing Fourdrinier Wires on a price basis?

An inferior Fourdrinier Wire may prove the Achilles Heel of your mill. A Tyler "Quality" Fourdrinier Wire will help you to get the maximum profit from your Fourdrinier machines—it will increase your output—it will help you make paper of the highest uniformity and quality.

Tyler Fourdrinier Wires are woven on looms designed by our own engineers and built in our own plant; the special formula wire used in weaving is drawn with great care in our own wire-drawing department to retain the maximum strength in the wire; and the weavers have devoted their lives to the art.

THE W. S. TYLER COMPANY, *Cleveland, Ohio*

Manufacturers of Fourdrinier Wires, Cylinder Faces, Backing Wires and Corduroy Cloth, Woven Wire Screens and Screening Equipment

TYLER FOURDRINIER WIRES

MITTS & MERRILL GRAVITY FEED SHREDDER

Giving the Beater a Lift

The operation of a beater, with its wear and tear and tremendous power consumption, has one primary purpose, namely, hydration. Any thing that will economically bring about hydration more quickly relieves the beater just that much, cuts down on operating costs and speeds the process of paper making.

The Mitts & Merrill Gravity Feed Shredder performs on magazines, books, old paper and boxboard, frozen or dried pulp laps in such a way as to greatly reduce their resistance to hydration when they reach the beater. It gives the beater an economical lift.

Our Shredders are built in sizes with spouts ranging from 18" to 45" wide. We will be glad to quote you on any size adapted to your requirements.

We also build a 100% efficient "Hog" to reduce pulp mill bark and wood refuse

MITTS & MERRILL 1013 Tilden St. SAGINAW, MICH.

American Pulpwoods

By SIDNEY D. WELLS

(Continued from September issue)

Red Gum—Liquidambar styraciflua. Wt. 27 lbs. Fiber 1.6 m.m.

Range—From Connecticut (Fairfield county) to southeastern Missouri and Arkansas south to Florida (Cape Canaveral and Tampa bay) and Texas (Trinity river).

Common Names—Sweet gum (Mass., R. I., N. Y., N. J., Pa., Del., Va., W. Va., N. C., S. C., Ga., Ala, Fla., Miss., La., Tex., Ark., Ky., Mo., Ill., Ind., Ohio); liquidambar (R. I., N. Y., Del., N. J., Pa., La., Tex., Ohio, Ill.); red gum (Va., Ala., Miss., Tex., La.); gum (Va.); gumtree (S. C., La.); alligator-wood (N. J.); bilsted (N. J.); star-leaved gum; satin walnut (lumber markets).

Sulphite Pulp—
Yield 1,190 lbs.
Character—
Easily pulped.
Difficult to bleach.
Very poor strength.
Dark colored.
Possible uses—Few.

Soda Pulp—
Yield 1,080 lbs.
Character—
A little more difficult to reduce than aspen.
Soft and hard to bleach.
Possible uses—Same as aspen.

CUCUMBER-TREE—Magnolia acuminata. Wt. 27 lbs. Fiber 1.3 m.m.

Range—From western New York through southern Ontario to southern Illinois and south in the Appalachian mountains to southern Alabama (Stockton) and northeastern Mississippi (Meridien); central Kentucky and Tennessee (near Nashville and eastern part of state); northeastern, southern and southwestern Arkansas.

Common Names—Cucumber-tree (R. I., Mass., N. Y., Pa., D. C. (cult.), N. C., S. C., Ala., Miss., La., Ark., Ky., W. Va., Ohio, Ind., Ill.); mountain magnolia (Miss., Ky.); cucumber (W. Va.); black lin (W. Va.); magnolia (Ark.); pointed-leaved magnolia (lit.).

Sulphite Pulp—
Yield 1,250 lbs.
Character—
Easily pulped.
Somewhat weak.
Difficult to bleach.
Dark colored.
Possible uses—Few.

Soda Pulp—
Yield 1,200 lbs.
Character—
A little harder to reduce and bleach than aspen.
Possible uses—Same as aspen.

Mechanical Pulp—
Probably similar to black gum.

SWEET MAGNOLIA—Magnolia glauca. Wt. 39 lbs. Fiber 1.3 m.m.

Range—Massachusetts (Gloucester, Essex county); Long Island (Turtle pond, Suffolk county); from New Jersey to Florida (Biscayne bay on the east coast and to Tampa bay on the west coast); west in the Gulf region to Texas (Trinity river).

Common Names—Sweet bay (Mass., R. I., Pa., N. J., N. C., S. C., Ala., Fla., Miss., La., Ark., Mo.); white bay (N. C., S. C., Ala., Fla., Miss., La.); swamp laurel (Mass., N. C., Ga., Miss.); swamp sassafras (Del., Pa., Tenn.); swamp magnolia (N. J., Pa., Tenn.); magnolia (N. J., Del., Pa.); white laurel (Del., Miss., La.); beaver-tree (Del., S. C., Miss.); bay (S. C.).

Sulphite Pulp—
Yield 1,680 lbs.
Character—
Easily pulped and bleached.
Fair strength.
Poor color.
Possible uses—Can be used without pulps from conifers in manufacturing of book, magazine and similar papers.

Soda Pulp—
Yield 1,680 lbs.
Character—
Easily pulped.
Rather difficult to bleach.

Starch

THE extensive list of the several varieties of

STARCH

manufactured by us and used by the most progressive manufacturers shows that our efforts in studying and meeting the needs of the industry have received gratifying recognition.

FOX HEAD NIAGARA SPECIAL PAPER

are the starches specially designed for Top-sizing, Beater-sizing and Pasting.

CORN PRODUCTS REFINING COMPANY
17 Battery Place New York

Starch

The Owner Can Forget This Tower

—at least so far as up-keep is concerned—because the Caldwell Hemispherical Tank with latticed column tower is built to avoid the need of repairs.

The Caldwell Hemispherical is correctly designed, all steel in construction, built according to approved engineering principles with properly riveted latticed columns and absolutely fireproof.

If you want a tower that will give you nothing but good honest service every day in the year, invest in a Caldwell Hemispherical.

Our experience of 30 years in building tanks and towers is at your service.

Send for Catalogue

W. E. CALDWELL CO.
INCORPORATED
2570 Brook Street
Louisville, Ky.

Caldwell TANKS AND TOWERS

VEELOS

TRADE MARK REGISTERED U.S. PAT. OFFICE
JUNE 21st, 1910

VEELOS

Genuine Balata Belting

The Ideal Belt for Paper Mills
Highest Quality Material
Best and Finest Workmanship
By Most Highly Skilled Craftsmen
Power-Saving Long-Lasting
On Service Basis Cost Is Lowest
Try a VEELOS

THE STANDARD BELT OF THE WORLD

Manheim Manufacturing & Belting Co.
Manheim, Pa.

MORSE SILENT CHAIN DRIVES

Morse Chain Driving Line Shaft

"Always on the Job"

Morse Silent Chain Drives operate continuously year in and year out. Every day they keep the machines turning, assuring volume production and low cost production. For insurance of continuous operation, install Morse Silent Chain Drives in your plant.

MORSE CHAIN CO., ITHACA, N. Y.

There is a Morse Engineer near you

Atlanta, Ga., 702 Candler Bldg., Earl P. Scott & Co.
Baltimore, Md. 1402 Lexington Bldg.
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Charlotte, N. C., 404 Commercial Bank Bldg.
Chicago, Ill., Room 809, 112 W. Adams Street
Cleveland, Ohio. 421 Engineers Bldg.
Denver, Colo., 1761 Wazee St., R. M. Parsons
Detroit, Mich. 7601 Central Avenue
Kansas City, Mo., Finance Bldg., Morse Eng. Co.
New York City, Room 1871, 50 Church Street
Minneapolis, Minn., 413 3rd St., S. Strong-Scott Mfg. Co.
Montreal, Que., Can. St. Nicholas Bldg., Jones & Glassco, Reg'd
Philadelphia, Pa., 612 Franklin Trust Bldg.
Pittsburgh, Pa. Washington Bldg.
San Francisco, Cal. Monadnock Bldg.
St. Louis, Mo., Chemical Bldg., Morse Eng. Co.
Toronto, Ont., Can., Bank of Hamilton Bldg., Jones & Glassco, Reg'd
Winnipeg, Man., Can., Dufferin St., Strong-Scott Mfg. Co.

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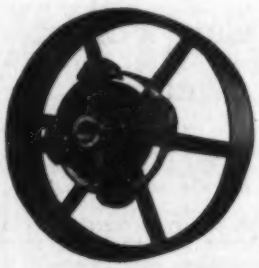
A complete line of



FALLS SOLID FRICTION CLUTCH PULLEY

Power Transmission Machinery

FOR

BELT AND ROPE DRIVES

MANUFACTURED BY

THE FALLS CLUTCH & MACHINERY COMPANY

NEW YORK 206-208 Fulton Street
Cuyahoga Falls, Ohio
BOSTON 52 Purchase Street

Catalogues upon request

THE JOHNSON FRICTION CLUTCH

Double Clutch Exterior

Is Also a Clutch for Reverse Drive on PAPER MACHINERY

When used on the countershaft one pulley is mounted on each hub of clutch and thru one open belt and one crossed belt the operation of a machine may be quickly and easily reversed.
Reverse motion may be obtained by installing the clutch between bevel gears on machinery.
Spur gears are often used to get two speeds on machinery.
The Johnson Clutch requires the minimum of space. It is smooth in its pickup and does not grab like a jaw clutch.

Write for Catalog PI.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN

Soft opaque fiber.
Possible uses—Same as aspen.
Mechanical Pulp—
Probably similar to black gum.

SYCAMORE—Platanus occidentalis. Wt. 29 lbs. Fiber 1.7 m.m.
Range—Southeastern New Hampshire and southern Maine to northern Vermont and Lake Ontario (Don river, near north shores of the lake); west to eastern Nebraska and Kansas and south to northern Florida, central Alabama and Mississippi and Texas (Brazos river and thence south to Devil's river).
Common Names—Sycamore (Vt., N. H., Mass., Conn., R. I., N. Y., N. J., Pa., Del., Va., W. Va., N. C., S. C., Ga., Fla., Ala., Miss., La., Tex., Ky., Ark., Mo., Ill., Ind., Iowa, Kans., Nebr., Mich., Wis., Ohio, Ont.); buttonwood (Vt., N. H., R. I., Mass., N. Y., N. J., Pa., Del., S. C., Ala., Miss., La., Tex., Ark., Mo., Ill., Nebr., Mich., Minn., Ohio, Ont.); button-ball-tree (Mass., R. I., Conn., N. Y., N. J., Pa., Del., Miss., La., Mo., Ill., Iowa, Mich., Nebr., Ohio); buttonball (R. I., N. Y., Pa., Fla.); plane-tree (R. I., Del., S. C., Kans., Nebr., Iowa); water beech (Del.); platane (La.); cotonier (La.); bois puant (La.); Oo-da-te-cha-wun-nes—"Big stockings" (Indians, N. Y.).
Sulphite Pulp—
Yield 1,300 lbs.
Character—
Easily pulped and bleached.
Poor strength.
Possible uses—Similar to aspen.
Soda Pulp—
Yield 1,300 lbs.
Character—
Soft, easily bleached.
Possible uses—Similar to aspen.

OHIO BUCKEYE—Aesculus glabra. Wt. 21 lbs. Fiber ———.
Range—From Pennsylvania (western slopes Allegheny mountains) to northern Alabama (Tennessee river valley and mountains) and west to southern Iowa, central Kansas and Indian Territory.
Common Names—Ohio buckeye (Miss., Ga., Ark., Mo., Ohio); buckeye (Pa., Ky., Mo., Ill., Ind., Ohio, Iowa, Kans.); fetid buckeye (W. Va.); stinking buckeye (Ala., Ark.); American horse chestnut (Pa.).
Sulphite Pulp—
Yield 940 lbs.
Character—
Easily pulped.
Rather difficult to bleach.
Silver gray color.
Possible uses—Same as aspen.
Soda Pulp—
Yield 940 lbs.
Character—
Fairly easily pulped.
Rather difficult to bleach.
Soft, opaque, short fiber.
Possible uses—Same as aspen.

MANGROVE—Rhizophora mangle. Wt. 56 lbs.* Fiber ———.
Range—Southern coast of Florida (Mosquito inlet and Cedar keys to southern islands); Mississippi delta; Texas coast; eastern and western coasts of Mexico; Lower California; from Central America along northern and eastern coast of South America to the limits of the tropics; Bermudas, Bahamas, West Indies; Galapagos Islands.
Common Name—Mangrove (Fla.).
Sulphite Pulp—
Did not test.
Soda Pulp—
Yield 2,400 lbs.
Character—
Readily pulped.
Difficult to bleach.
Short fiber.
Possible uses—Same as aspen.
*From comparatively few specimens.

BUTTERNUT—Juglans cinerea. Wt. 22 lbs. Fiber 1.2 m.m.
Range—Southern New Brunswick to Delaware and on the Appalachian mountains to Georgia and Alabama (head waters of Black Warrior river, Winston county); westward through Ontario to Dakota, southeastern Nebraska, southern Missouri and northeastern Arkansas.
Common Names—Butternut (Me., N. H., Vt., Mass., R. I., Conn., N. Y., N. J., Pa., Del., W. Va., N. C., S. C., Ala., Ark., Ky., Mo., Ill., Iowa, Ind., Mich., Minn., Wis., Kans., Nebr., Ohio, Ont.); white walnut (Del., Pa., Va., W. Va., N. C.,

DUXBAK BELTING
TRADE MARK
for
wet places,
dry places,
hard drives
—an ideal belting for paper mill drives
Send for Catalogue
DUXBAK BELTING TRADE MARK
Chas. A. Schieren Company
Tanners
Leather Belt Mfrs.
Main Office and Factory
73 Ferry Street, NEW YORK
Branches and Distributors in All Leading Cities

Nothing Like Leather
For Paper Mills
A RECENT report from a Pennsylvania paper mill tells of the splendid record being made by four 6-inch Tannate Watershed Belts that they are trying out in place of rubber belts previously used. The life of the rubber belts was three to four weeks; the Watershed Tannate Belts had been on sixteen months and still going strong. Rhoads Watershed is our best development in leather belting. It is primarily a waterproof belt, but the strong waterproof cement and the special treatment of the leather make an unusually long lasting, strong gripping belt for any hard drive, wet or dry.
If you have a drive on which you want the best, specify Watershed Tannate.
J. E. Rhoads & Sons
PHILADELPHIA 39 N. Sixth St.
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Watermarking a Specialty

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Originators and Oldest Manufacturers
OF THE
Cast Bronze Screen Plate

ALSO SPECIALIZE IN

Acid Resisting Digester Parts

UNION SCREEN PLATE CO.

Fitchburg, Mass., U. S. A. **Lennoxville, P. Q., Canada**

UNION BRONZE SCREEN PLATES

(Best phosphorized Cast Metal)

Old Plates RECLOSED and RECUT to accurate gauge
UNION BRONZE SCREWS for Screen Plates
Immediate Delivery of the Largest Orders. Satisfaction Guaranteed

The Witham Screen Plate Fastener, Patented

THE ORIGINAL THE BEST

PUMPS

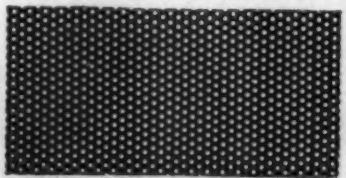
INDUSTRIAL—AGRICULTURAL—MUNICIPAL—RESIDENTIAL

A Type for Every Service

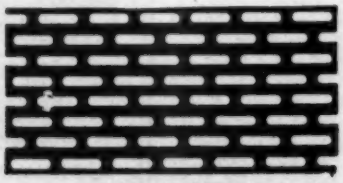
THE GOULDS MANUFACTURING COMPANY
SENECA FALLS, N. Y.

GOULDS

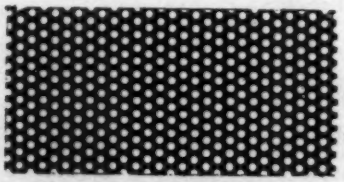
Perforated Metal Screens for Pulp and Paper Mills



.065 inch round



⅛ x ⅜" Slots



3/32 inch round

Steel, Copper, Brass, Bronze and other alloys punched for Centrifugal and Rotary Screens, Pulp Washers, Drainer Bottoms, Filter Plates, etc.

CHARLES MUNDT & SONS **57-65 Fairmount Avenue, Jersey City, N. J.**

S. C., Ala., Ky., Mo., Ill., Ind., Wis., Iowa, Nebr., Minn., S. Dak.); walnut (Minn.); oil nut (Me., N. H., S. C.); butternut (N. J.).

Sulphite Pulp—
Yield 1,000 lbs.
Character—
Easily pulped and bleached.
Weak and poor color.
Possible uses—Same as aspen.

Soda Pulp—
Yield 1,000 lbs.
Character—
Easily pulped.
Difficult to bleach.
Short, opaque fiber.
Possible uses—Same as aspen.

CATALPA—Catalpa catalpa. Wt. 31 lbs. Fiber ———.

Range—Supposed to be indigenous only in southwestern Georgia, western Florida, central Alabama and Mississippi, but widely cultivated and naturalized elsewhere east of the Rocky mountains.

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Sulphite Pulp—
Yield 1,390 lbs.
Character—
Fairly easily pulped.
Difficult to bleach.
Short fiber, specky and pink.
Possible uses—Same as aspen.

Soda Pulp—
Yield 1,340 lbs.
Character—
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Short, opaque fiber.
Possible uses—Same as aspen.

(To be concluded in a subsequent issue)

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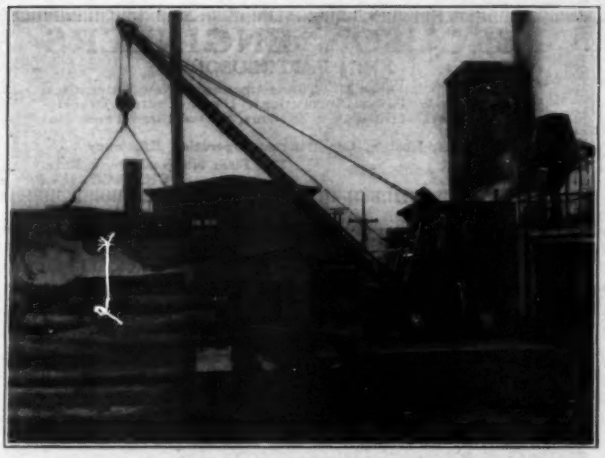

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New York, January 2, 1924.

THE new year opens with the paper market characterized by conditions usually in evidence immediately after the holiday period, but with the outlook very promising. There is at the moment no important demand emanating from consuming sources for most kinds of paper. Of course news print and some of the specialty grades of paper are moving in large tonnage, perhaps in heavier volume than the trade has ever witnessed, but book, fine, wrapping, tissue and other kinds of paper are in limited call and prices of such papers have, in some instances, developed an easier undertone.

Prospects for the new year are certainly bright. This does not mean that any boom is likely to be experienced in the paper market in 1924—just the contrary is true; there is every apparent reason to expect a steady and healthy demand of moderately broad proportions for paper of all kinds during the coming twelve months. Most assuredly general business conditions are favorable. There is not, nor has there been in the closing months of the old year, the volume to the demand for manufactured and raw commodities that many producers and merchants would like to see, but it cannot be denied that business is of fair breadth, that the economic condition of the country is good, that the financial position is sound, and that a degree of healthiness exists in the whole commercial structure that has not been witnessed since pre-war days.

The business men of the nation have ever since the outbreak of the world conflict been pining for stability in business. They now have stability and normalcy; prices of various commodities have been readjusted on levels where there should be no worry over the danger of any severe declines, and business is developing in a manner which should instill confidence in manufacturers and merchants and lead to an expansion in production, and a corresponding increase in distribution among consumers. Since paper is so dependent on the situation existing in various other industries, the fact that the general business outlook is so encouraging is creative of bright prospects for activity in the paper market.

There is one factor which promises to have a highly important bearing on the paper market during 1924. That is the factor of production. If paper manufacturers will only see the logic in regulating their output in accordance with the prevailing demand, and adjust their buying of raw material and do what they can to eliminate unfair and unnecessary competition in marketing their product, they should enjoy a prosperous year in the twelvemonth just started. There is no denying that the paper mills of the country are so equipped at present that their productive capacity is in excess of the consumptive requirements of the nation, particularly with export trade in paper having dropped off to its present dimensions. Paper manufacturers expanded their plants during the war and afterward to such an extent that there is little reason for them to hope to keep their production at a maximum all the time or even for any considerable stretch of time. What is more important is for them to gauge their manufacturing operations in proportion to the existing demand so as not to flood the market with paper and thus weaken prices against themselves while at the same time creating an unwarranted market for raw material and sending prices of same upward.

In other words, there should be a good and healthy demand for paper of all kinds this year approximating normal of the past several years, if not a little better, and far above the normal of pre-war days. Therefore, if manufacturers do the right thing and do not depress prices of their product by overproduction, the industry should, judging from present indications, enjoy a prosperous and busy year in 1924.

The mere fact that news print consumption is on a record-breaking scale and giving every promise of continuing so is ample basis for expectations that the present year will be an active one for the industry, as after all print paper constitutes the most important kind of paper from the point of view of volume of production. Figures of 1923 production will soon be available and there is no doubt that they will show a new high record of output was established last year in both the United States and Canada. News print production in the United States in November totaled 119,720 tons, against 122,073 tons in October, while shipments from mills were 117,176 tons, compared with 124,894 tons in the preceding month. The output of Canadian mills in November amounted to 110,839 tons, contrasted with 114,475 tons in October, while shipments were 110,786 tons, against 112,996 tons. During the first eleven months of 1923 Canadian mills produced a total of 1,166,225 tons of news print, compared with 993,988 tons in the corresponding period of 1922, the increase being equal to 17 per cent. The estimated production of Canadian mills for the entire year is 1,270,000 tons, or 189,000 tons over that for 1922.

Book paper is holding in price in so far as quotations go, but it is apparent some manufacturers are shading prices to attract business. Book paper mills are in want of orders and they are not permitting a matter of a slightly lower price to stand in the way of them securing business, especially when tonnage lots are involved. Machine finished book is quoted at around 6.50 cents per pound f.o.b. New York, with quotations ranging down to 6 cents, while coated book paper is quoted at from 8 cents a pound upward.

There has been quite a break in wrapping paper prices. No. 1 domestic kraft is selling at 6 cents a pound f.o.b. New York in some instances, and even cheaper prices have been mentioned, while the No. 2 grade is quoted about 5.50 cents. Tissues are quotably steady, and fine papers show little change in price.

Board quotations have stiffened, particularly in the East, where manufacturers quote $52.50 a ton f. o. b. New York for filled news board and $47.50 a ton for plain chip. Demand for board has been seasonably quiet during the past few days, but buying is due to increase against spring requirements in the paper box trade within the next several weeks.

China Surpassed

It has been fashionable to direct attention to China when an example was wanted of a dead nation. We, in the progressive United States think ourselves ahead of the times, but the United States and China have contested fiercely to see which would be the biggest waster of forest resources and the United States won easily, says the New York State College of Forestry at Syracuse University.

The debauch by nations of their natural resources is nothing new. King Solomon and some of his friends indulged in it and left Mesopotamia practically treeless. Most of the Greek patriarchs and Roman Emperors were good tree killers. All the Mediterranean countries, in fact, all nations from time to time have had their orgies of forest devastation, and just to prove that history repeats itself Uncle Sam as soon as he got on long breeches started right in to smash all records as a timber annihilator. He annexed the speed trophy by a large margin and took the medal for quantity, too.

Nations that had learned their lesson in forest destruction sat back and laughed. Japan, Austria, Norway, Sweden, Italy, Turkey, Greece, Spain, Portugal, Switzerland, New Zealand, France, Germany, England and even Russia have indulged in this national waste and have started to repair or have already repaired the damage. It will be as much folly if we fail to bring back an adequate supply of timber as it was to destroy the virgin forests. Are we to heed the lessons taught by these countries or still keep company with the backward policies of China? If we are to profit by the history of forest destruction, we should demand a strong forest program that will assure an ample supply of wood and stick to that demand until such a program is adopted by a cooperative movement between our national and state legislatures.

Direct factory branches and warehouses have been established in San Francisco and in Los Angeles by the Chain Belt Company of Milwaukee, Wis., manufacturers of Rex chains, transmission machinery and conveying equipment. The San Francisco office is located at 82 Natoma Street, with G. E. Taylor in charge as district manager. The Los Angeles branch is located at 210 South San Pedro Street, with Mr. J. V. McDonald as district manager.

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Domestic Raw Materials

Papermaking Rags

A firm tone prevails in the market for papermaking rags and such changes as have occurred recently have been in an upward direction; in fact, prices of some grades have scored substantial advances. It would appear, however, that strength in the market is due more to causes at the supply end than to any heavy buying by paper mills. It is proverbial that paper manufacturers purchase raw material in a very limited way during the last couple of weeks of the year and the first fortnight or so of a new year, and consumers have not digressed from their usual policy in this connection this winter, yet demand has been fully up to normal recently, and, as regards certain grades, probably a little better than normal. This, coupled with rather low supplies in dealers' hands, the small incoming supplies from domestic collection sources and firmness in the markets in European countries, is creative of a decidedly firm price undertone.

There is one factor having a very important bearing on the rag market and that is the abnormally high price ruling on raw cotton. Rag stock is being consumed in large quantities as a substitute for cotton. Shoddy and fibre mills are perhaps absorbing more rags than they ever have bought at one time in the past, reflecting the big demand for cotton substitutes, and it is apparent that a great many rags which would ordinarily find their way into paper mills are at present moving into other avenues of consumption. Competition on this score is not only helping to sustain prices but is making for advancement in some grades. Moreover, this factor is likely to have even greater influence later on when demand from paper manufacturers is due to expand. Should paper mills come into the market as is their custom during the latter part of January or early in February to purchase rags in usual volume the probabilities are they will not find normal stocks in packers' warehouses to draw on, and this may lead to a further rise in prices. Certainly the outlook is anything but over encouraging from the paper manufacturer's point of view.

The rag markets in Europe are displaying pronounced strength. Prices on nearly all kinds of foreign rags have advanced considerably during the past few weeks. Indications are that a good many American paper mills are purchasing a larger proportion of imported rags than they ordinarily do, and dealers on the other side of the Atlantic claim they haven't usual stocks and that supplies are coming in to them in subnormal amounts, which two factors explain the strong position of prices. European dealers are said to be holding firm for at least certain prices, and importers in New York assert that their bids under the levels desired by shippers on the other side are invariably turned down by the latter.

There is another factor contributing to prevailing high prices for rags. Labor is expensive and scarce. Packers contend that it is imperative that they receive much higher prices for their rags than were regarded as normal in the old days for the reason that it costs so much more to collect, handle, sort and pack stock today. Collectors insist on realizing a certain return for their work in gathering rags or else they forsake the industry and go into other more lucrative forms of employment, and there is no denying that plenty of work is available for them in other trades since the shortage of common labor is quite pronounced. Mixed rags as they come from country districts, it is stated, are bringing 2.50 cents a pound and higher at present in sales to grading concerns or close to twice the price they sold at prior to the war. The cost of grading is proportionately as expensive and packers contend they must secure relative increases for their whites, blues, roofing rags and other grades in order to make a profit in their operations.

As against these bullish factors, it is true that consumption of rags by paper mills, with the exception of the low grades, has been of light volume in the past few months. Most mills have used sulphite in their writing papers, that is in larger proportion than ordinarily because a better movement of the cheaper qualities of fine paper has been effected than of the high-priced lines. Doubtless the increased consumption in other industries has offset this reduced consumption by paper manufacturers, but the limited paper mill consumption is a bearish factor nevertheless. Unless the requirements of papermakers increase to a very considerable extent therefore there should not be any further broad rise in rag prices; in fact, there are many connected with the trade who are of the opinion that the advance toward the end of the year constituted the usual strengthening of the market that occurs along about February and that it is as likely as not that prices will develop a sagging trend in the near future.

Roofing rags have been and are still the strongest item in the market. Indications are that several roofing paper mills went short of stock, and, suddenly finding themselves in want of supplies about the middle of December, came into the market to buy on a fairly large scale. Prices of both domestic and foreign roofing rags rose sharply thereupon. No. 1 domestic stock sold in the East at 1.90 cents a pound f.o.b. New York, and No. 2 packing at 1.60 cents, while foreign dark colored cottons advanced to 1.60 and 1.65 cents ex dock New York and foreign linsey garments to 1.70 cents. Higher prices are reported in the Middle West, where several of the mills which were the biggest buyers on the advance are located.

New cuttings of most kinds have stiffened in price. Dealers now ask 13.50 cents or higher per pound at shipping points for No. 1 white shirt cuttings, 11.75 cents for unbleached muslins, 8.25 cents for light silesias, 6.25 cents for fancy shirt cuttings, 8.75 cents for blue overall cuttings, 5.50 cents for washables and 5.50 cents for black silesias. Foreign new cuttings also advanced.

Old whites are quoted at from 6.75 cents per pound at dealers' shipping points for No. 1 repacked, and around 4.25 cents for No. 2 grade. Thirds and blues are firm at 3 to 3.25 cents a pound for repacked, and 2.40 to 2.60 cents for rough packing.

Average quotations f.o.b. shipping points and ex dock are:

New Stock—	New York and Chicago
White shirt cuttings, No. 1	13.50-14.00
White shirt cuttings, No. 2	6.25- 6.50
Fancy shirt cuttings	6.25- 6.50
Washables, No. 1	5.25- 5.50
Unbleached muslins	11.50-11.75
White lawns	11.25-11.50
Overall cuttings, blue	8.50- 8.75
Black silesias	5.25- 5.50
Light flannelettes	9.75-10.00
Canton flannels, bleached	11.25-11.50
Canton flannels, unbleached	10.50-10.75
Shoe cuttings, bleached	9.75-10.00
Shoe cuttings, unbleached	8.75- 9.00
Light silesias	8.25- 8.50
O. D. khaki cuttings	5.00- 5.25
Mixed khaki cuttings	4.50- 4.75
Corduroy cuttings	3.75- 4.00
Cottonade cuttings	4.00- 4.25
Linens, No. 1 white, foreign	15.50-16.00
Light prints, foreign	5.50- 6.00
Old Stock—	
Whites, No. 1, repacked	6.75- 7.50
Whites, No. 2, repacked	4.00- 4.50
Whites, house soiled	3.00- 3.25
Whites, street soiled	2.75- 3.00
Lace curtains	4.25- 4.50
Thirds and blues, rough	2.40- 2.60
Thirds and blues, repacked	3.00- 3.25
Black stockings	3.50- 3.75
Cotton canvas, No. 1	4.25- 4.50
White cotton batting	6.50- 7.00
Roofing, No. 1	1.90- 2.00
Roofing, No. 2	1.55- 1.70
Dark colored cottons, foreign	1.60- 1.65
Blue linens, foreign	4.50- 5.00
Gray linens, foreign	6.00- 6.50
White linens, foreign	10.50-11.00
Light prints, foreign	3.50- 3.75

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Rope and Bagging

After ruling strong for quite a while, the market for old rope has eased somewhat and prices are on a lower level. Apparently those paper mills which were the largest buyers of old rope for a time covered their requirements in a way sufficient to enable them to curtail their purchasing, and by so doing effected a lowering of prices. Domestic manila rope of No. 1 grade is quoted at about 6.50 cents a pound at dealers' shipping points, and foreign manila rope at 6 cents ex dock New York. Prices have steadied at these levels following a decline which temporarily appeared likely to carry market levels much lower than happened to be the case, and dealers contend that the limited available supplies should hold up prices on at least prevailing levels. Strings are steady in price and in fair demand, sisal strings especially which are bringing 2.25 to 2.50 cents a pound f.o.b. shipping points.

Old bagging is in a little firmer market position. No. 1 scrap is selling at around 1.25 cents per pound at dealers' points and in cases where extra quality packing is concerned up to 2.50 cents. Roofing bagging is quoted at one cent a pound or very close to that basis at shipping points.

F.o.b. shipping point quotations follow:

	New York and Chicago
Gunny, No. 1 domestic	1.25-1.35
Gunny, No. 1 foreign	1.15-1.25
Scrap bagging, No. 1	1.25-1.50
Roofing bagging	.90-1.00
Wool tares, heavy	1.50-1.65
Wool tares, light	1.40-1.50
Manila rope, No. 1, foreign	5.75-6.00
Manila rope, No. 1, domestic	6.25-6.50
Sisal strings	2.25-2.50
Mixed strings	1.00-1.25

Old Paper

Not a great deal of difference is noted in prices of waste paper from those last reported. The market has been only moderately active and such changes as have developed have been, with a few exceptions, in a downward direction. Demand from mills has been of strictly routine character and has lacked volume, board and book paper manufacturers buying merely to cover direct requirements and generally managing to secure the supplies wanted at very nearly their own prices.

There is still a wide discrepancy between prices prevailing in the East and those obtaining in the West. For example, No. 1 mixed paper is selling in the Middle West at close to a cent a pound at dealers' shipping points while the same grade in the East is worth no more than 60 cents a hundred pounds f.o.b. New York. Similarly, old folded newspapers are quoted in the West at about 1.10 cents a pound at shipping points and at 80 to 85 cents a hundred pounds f.o.b. New York.

Shavings are noticeably neglected by mills. A relatively better demand exists for soft than hard shavings, and No. 1 soft white shavings are quoted at 3 to 3.25 cents a pound at shipping points, and No. 1 hard white shavings at 3.75 to 4 cents. Book stock is in limited demand but quotations hold at about 1.50 cents or slightly higher for No. 1 heavy books and 1.25 cents for No. 1 crumpled book stock. Old kraft paper is steady at around 2.10 cents a pound, and a particularly firm grade is white blank news, for which dealers ask a minimum of 2.25 cents a pound at shipping points.

F.o.b. shipping point quotations are:

	New York and Chicago
Hard white shavings, No. 1	3.75-4.00
Hard white shavings, No. 2	3.25-3.50
Soft white shavings	3.00-3.25
Colored shavings	1.50-1.75
Heavy book, No. 1	1.50-1.75
Crumpled book, No. 1	1.25-1.40
Ledger stock	2.00-2.15
Kraft, No. 1	2.10-2.20
Manilas, No. 1	1.10-1.35
White blank news	2.25-2.35
Over-issue news, No. 1	1.10-1.20
Folded news	.80-1.10
Mill wrappings	.90-1.00
Mixed paper, No. 1	.60-1.00
Common paper	.40- .50

Chemical Pulp

Consuming demand for chemical wood pulp continues quite limited but there are encouraging signs of increased interest on the part of paper manufacturers, and the price tone is

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SOLVAY 58% Soda Ash contains 58% of actual sodium oxide

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Specify SOLVAY—the standard in SODA since 1881

The Solvay Process Co.
Detroit, Mich.; SYRACUSE, N. Y.; Hutchinson, Kas.

Sales Agent
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The Sphinx Says:

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Arabol Sizes are—
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"Reliable" Rosin Size
All that the name implies

The Arabol Manufacturing Co.
Executive Offices: 110 East 42nd Street
NEW YORK

much steadier than it was. Buyers are operating in the market only when pressed by necessity, it would seem, and it is apparent that the biggest part of the movement toward consuming mills is against contracts, transient demand being of little consequence as it usually is so early in the year. There is every indication, however, that the decline in prices has spent its force and that the market is now resting on the lowest levels that are likely to be reached in the present movement; in fact, the tendency is in an upward direction rather than downward, and sentiment among those on the selling side of the trade is vastly improved, many producers and dealers looking for a reaction upward in market values as soon as demand opens up after the holiday period.

Leading manufacturers of bleached sulphite continue to quote 4 cents a pound f.o.b. pulp mills for No. 1 bleached, with the extra high grade quoted at 4.50 cents. In some instances prices of bleached are being shaded, however. Unbleached sulphite is quoted at around 2.75 cents a pound at pulp mills, with some quotations down to 2.60 cents named, and with news grade sulphite available at 2.50 cents upward at producing plants. Kraft pulp is quoted at around 2.75 cents a pound, and bleached soda pulp at 3.50 cents f.o.b. pulp mills.

F.o.b. pulp mill quotations follow:

Bleached sulphite	4.00-4.50
Easy bleaching sulphite	3.00-3.25
Unbleached sulphite, No. 1	2.60-2.90
News grade sulphite	2.50-2.75
Soda pulp, bleached	3.50-3.75
Mitscherlich, unbleached	3.00-3.25
Kraft, No. 1	2.65-3.00
Screenings, refined	1.75-2.00

Mechanical Pulp

Ground wood quotations are steady on a fairly stabilized level and there is comparatively good activity in the trade. Domestic spruce ground wood is quoted at an average of $40 per ton f. o. b. producing mills, with prices, of course, differing in accordance with the air dry test and the freight from grinding plants to consuming centres, producers quoting a little lower for pulp to be shipped a far ways off and higher rates for nearby shipments. There is a fairly large supply of foreign ground wood of Scandinavian origin available at prices ranging around $37 a ton ex dock New York, and some consumers are said to be filling the bulk of their requirements with such pulp.

As the winter progresses expectations are for a stiffening of prices of ground wood. Some grinders already are hampered by unfavorable water conditions and have been obliged to curtail their operations, and it is generally conceded that mill stocks of mechanical pulp are subnormal owing to the heavy consumption by news print mills in recent months. Some producers have no supply at all to direct to the open market because of their own large requirements. This, it is felt, will at least sustain market values if not lead to an advance.

Chemicals

The movement of papermaking chemicals is chiefly against contracts and old orders, current demand being of limited compass. Quotations nevertheless hold fairly firm, with no changes of great importance noted. Bleaching powder is quoted at 1.25 to 1.35 cents a pound at works for bleach in domestic drums. Soda ash is quoted at about 1.40 cents a pound, and caustic soda at 3 to 3.25 cents per pound. Casein prices range from 13 to 15 cents a pound, duty paid on the foreign product.

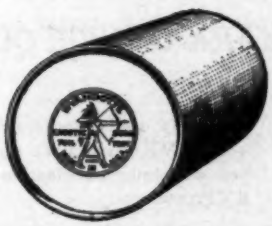
Average quotations are as follows:

Alum, lump ammonia	3.25- 3.50
Alum, lump starch	3.75- 4.00
Blanc fixe, powdered	4.00- 4.25
Bleaching powder	1.25- 1.35
Brimstone (long ton, at mine)	18.00-20.00
Casein (duty paid)	13.00-15.00
Caustic soda, spot delivery	3.00- 3.25
China clay, domestic washed	12.00-15.00
China clay, foreign	15.00-20.00
Rosin, grade E	5.80- 5.90
Satin white	1.75- 2.00
Soda ash, 58 per cent light (bags)	1.40- 1.50
Starch, papermakers', in bags	3.40- 3.70
Talc (ton)	14.00-16.00

Johaneson, Wales & Sparre, Inc., importers of wood pulp of 16 East Forty-first St., New York, have leased additional space at that address and have materially increased the size of their offices.

SODA ASH

CAUSTIC SODA



MICHIGAN ALKALI COMPANY

General Sales Department

21 East 40th Street, New York

Works: Wyandotte, Michigan

"Distinguished for its High Test and Uniform Quality"

Do You Know

How much pulp may be made from a cord of wood?
How much pulpwood and wood pulp has been exported from Canada?
That the per capita consumption of paper in the United States is 150 lbs. yearly?
That paper-making is a billion-and-a-half-dollar industry in North America?
That 100 million cords of pulpwood have gone into paper in the United States and 30 million cords in Canada?
That a permanently self-contained operation for the manufacture of 100 tons of news print paper daily may require the equivalent of an investment of $10,000,000?
What it cost to grow timber?
What are the essentials of a National Forestry policy?
What are the essentials of a forest "Working Plan"?
What regulations apply to timber cutting in the public forests?
How much forest land in North America is publicly owned and now much privately?
How much and what kinds of timber there are yet left in the various regions of the United States and Canada?
That forestry is the application of definite scientific principles to the growing and using of timber crops.

These are only a few of the questions that are discussed in Royal S. Kellogg's new book entitled

"Pulpwood and Wood Pulp in North America"

The book is of special interest to everyone connected with the pulp and paper industry. It points out clearly what must be done to develop sufficiently our supply of pulpwoods. It shows the steps necessary in forest conservation and discusses the subject from the practical viewpoint of industrial needs.

The book describes the pulpwood industry, the processes of making paper pulp from wood, the timber supply of North America, the need for increased timber production and the future possibilities of the pulp and paper industry. Detailed statistics of production and consumption since the establishment of the industry are given in the appendix and shown in the text by means of graphic charts of unusual effectiveness. The book also carries many illustrations typical of mill operations and forest scenes.

This book should be in the library of every man who is interested in the present and future development of the paper industry.

270 pages, 6x9, 87 illustrations, $4.00 (English price 20s.) net, postpaid. Address all orders to THE PAPER INDUSTRY, 336 Monadnock Bldg., Chicago, Ill.

RECENTLY ISSUED

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A Theoretical Discussion of the Reactions of Papermaking: Jessie E. Minor.

Anti-Friction Bearings: G. H. Spencer.

Bibliography of Papermaking for 1922: C. J. West and A. Papineau-Couture.

Chemistry of the Alkaline Wood Pulp Processes: S. D. Wells and others.

Chemistry of the Sulphite Process: R. N. Miller and W. H. Swanson.

Discussion of papers.

Drying and Conditioning of Coated Paper: J. O. Ross.

Effect of Atmospheric Humidity on Paper Tests: P. L. Houston and H. S. Kirkwood.

Efficiency of Paper Drying: S. B. Jones and W. F. Goldsmith.

Evaporation of Spent Liquors: G. K. Spence.

Lake Color Manufacture: H. H. Holden.

Methods of Establishing Wage Rates and Determining Promotions: H. P. Carruth.

Papers on various subjects.

Paper testing; several papers.

Reports of committees.

Steam Economy in Pulp and Paper Mills: E. P. Gleason.

Steam Flowmeters on Sulphite Digesters: W. H. Kraske.

Study of Papermaking Materials: A. B. Green.

Use of White Water in Mechanical Pulp Mills: W. E. Brawn.

Ventilation of Machine Rooms: J. O. Ross.

Waste in the Industry: R. B. Wolf and G. D. Bearce.
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Utilization of Barking Drum Waste.
Reduction of Broke Losses.

Technical Association of the Pulp and Paper Industry
18 East Forty-first Street **New York, N. Y.**

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Useful as well as ornamental —the KVP trade mark signifies consumer satisfaction in KVP products:

Genuine Vegetable Parchment
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Household Specialities.

KALAMAZOO VEGETABLE PARCHMENT CO.
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EASTERN COMPANY MANUFACTURING

BLEACHED SULPHITE

Made from spruce grown in the forests of Northern Maine.

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EASTERN MANUFACTURING CO.
501 Fifth Avenue NEW YORK

New Papers

Writing—	
White rag	20-45
White sulphite	11-30
Colored rag	16-40
Ledger—	
White rag	20-50
White sulphite	13-30
Colored sulphite	14-30
Colored rag	16-50
Bonds—	
White rag	19-45
White sulphite	9-30
Colored Sulphite	10-30
Colored rag	18-45
Book—	
No. 1 S. & S. C.	6.50- 7.25
Machine finished	6.25- 7.00
English finished	6.50- 7.25
Coated and enameled	8.00-12.00
Lithographed, M. F.	9.00-14.00
Newsprint—	
Rolls, contract	3.75- 4.00
Rolls, transient	4.00- 4.25
Sheets	4.25- 4.50
Side runs	3.25- 3.75
Cover Stock—	
Coated, both sides	10.25
Coated, one side	10.15
Tissue—	
No. 1 white, 20x30	.80- .90
No. 2 white, 24-36	.70- .80
No. 1 manila, 24-36	.70- .80
Kraft	1.00- 1.25
Wrappings—	
No. 1 Kraft	6.00-6.50
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Boards—	New York and Chicago
Solid news	55.00-60.00
Straw	55.00-60.00
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White coated chip	65.00-70.00
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Binder's board	75.00-80.00

Milwaukee to Hold Graphic Art Exposition

A coming event which should be of interest to the paper industry, in that it affords an excellent opportunity for paper and paper machinery manufacturers to display their products to which is probably the biggest paper consuming industries, is the Third Educational Graphic Arts Exposition, which is to be held in the Auditorium at Milwaukee, Wis., August 18 to 23, 1924.

This exposition is to be given under the auspices of the Milwaukee Club of Printing House Craftsmen and is not to be conducted for profit. Plans are being made to make it the biggest and most complete exposition yet held. The last exposition, held in Boston, Mass., in 1922, was declared a huge success in that it brought visitors and exhibitors from all parts of the country. In Boston, during the week of the show, some 150,000 visitors passed through the exposition.

The printing, lithographic and associated trades are closely related to the paper industry, in that they deal with paper exclusively and are purchasers of large quantities of paper. The exposition will co-operate with the paper industry in allowing paper manufacturers considerable space in which to put up booths to show their wares.

Due to the fact that this next exposition will be held in Milwaukee, which is the center of the paper industry in Wisconsin, the second largest paper producing state, there should be no reason why the paper industry should not take advantage of this opportunity and be well represented there.

In discussing the prospects for a representative paper-making machinery and equipment exhibit for the Milwaukee Show, E. G. Myers, sales manager, said:

"Achievement in the paper, printing, lithographic and associated trades has not come about through mere chance. Everlasting persistence, vision and enterprise, plus co-operation, alone are responsible for the present high standing of the printing and allied crafts among the great industries of the world.

"Milwaukee is the center of one of the largest and most progressive paper making territories in the United States. The mills of Wisconsin and the executives operating such mills constitute a formidable and potential buying power in the paper making industry. So we feel we are giving to the manufacturer of machinery and equipment serving the paper making trade an unusual opportunity to demonstrate and talk his equipment under the most favorable circumstances."

Indicative of the tremendous importance of Wisconsin in the paper and pulp making industry are the 1923 statistics which were recently issued by the Wisconsin Paper and Pulp Makers' Association, comprising some twenty-four mills in Wisconsin:

Invested Capital	$118,833,660
Tons Pulp Annually	624,738
Value Pulp	33,857,829
Tons Paper Annually	795,876
Value Paper	88,546,541
No. of Employees	16,218
Annual Payroll	20,275,383
Cars in and out Annually	294,895
Cords P. W. consumed annually	1,086.616

Change in Chemical Prices

The following letter, recently received from the Mathieson Alkali Works, Inc., New York City, in regards to change in price of Bleaching Powder and Liquid Chlorine, is quoted below:

"One of the leading producers announce that they have withdrawn all previous quotations for new business and after January 5th will quote as follows:

"Bleaching Powder for Spot Sales and Future Contracts in Carload Lots—$1.50 per 100 lbs. in Standard (700 lb.) drums, f.o.b. Niagara Falls; $1.75 per 100 lbs. in Small (300 & 400 lb.) drums, f.o.b. Niagara Falls. Shipment in Less Carloads, Spot or Contract, fifteen (15) cents per 100 lbs. above these figures.

"Liquid Chlorine for Spot Sales and Future Contracts in Tank Car Lots—$3.50 per 100 lbs. (Single Units or Multi Units) f.o.b. Niagara Falls; $4.50 per 100 lbs. in cylinders, in carload lots, f.o.b. Niagara Falls; $5.00 per 100 lbs. for sales of more than one ton, f.o.b. Niagara Falls; $6.00 per 100 lbs. for sales of one ton and less, f.o.b. Niagara Falls."

Fireproof Paper

Considerable interest has been shown in the chemical process for making paper fireproof, which was invented by Abraham White, a member of the International Association of Fire Engineers and Associate Member of the National Fire Protection Association, and which is patented and controlled by the Nofyre Products Company of New York City.

Paper thus treated, when applied to fire, will char but will not burn of itself. Another feature is that the appearance or quality of the paper is not changed after being thus treated. The "Fire and Water Engineering" magazine sent their November 75-pound coated cover stock to the laboratory of the Nofyre Products Company to be treated. This did not affect the printing of their cover in any way.

The Fireproof company also have solutions for fireproofing cloths and textiles of all kinds, paint, oil, petroleum and gasoline products. Their claim is that they can fireproof anything that burns.

The Metropolitan Life Insurance Company of New York City have issued "The Sales Budget," which is number three of their series of business leaflets. This little booklet gives an interesting talk on how the sales budget is prepared.

J. ANDERSEN & CO.

21 East 40th Street, New York City

Importers of Chemical Pulps
BLEACHED AND UNBLEACHED

Agents for Kellner Partington Paper Pulp Co., Ltd.
Sarpsborg, Norway; Forshaga, and Edsvalla, Sweden

The Pulp and Paper Trading Co.

21 East 40th Street New York City

DEALERS IN DOMESTIC CHEMICAL AND MECHANICAL PULPS AND PAPER

AGENTS FOR
J. & J. Rogers Company, Ausable Forks, N. Y.
E. B. Eddy Company, Ltd., Hull, Canada

Canadian Kraft Limited, Three Rivers, Canada
Dealers in Wayagamack Kraft Pulp

Howard Smith Paper Mills, Montreal, Quebec
EASTERN AGENTS of Sulphite Pulp. Made by
Port Huron Sulphite & Paper Co., Port Huron, Mich.

The B Co. QUALITY PULPS

HAFSLUND NORWAY — **"HAFSLUND BEAR"** Bleached Sulphite

F. HAGA — **"FORSHAGA"** Bleached Sulphite

KRAFT HURUM NORWAY SPECIAL — **"HURUM SPECIAL"** Extra Strong Kraft

KOOS BAC — **"BAMBLE"** Extra Strong Kraft

The Borregaard Company
200 Fifth Ave. Incorporated New York, N.Y.

Agents
A/S TOTEN CELLULOSEFABRIK
Bleached Sulphite

A/S GULSKOGEN
CELLULOSEFABRIK
Easy Bleaching
Sulphite

PERKINS-GOODWIN CO.
NEW YORK
PULP and PAPER

Agents
SUND AKTIEBOLAG
Strong Unbleached Sulphite
(Indirect Cooking)

EXPORTS

Exports of paper from the United States continued to show an increase in October last compared with the same month of 1922. Total exports of paper of all kinds in October, 1923, amounted in value to $2,118,841, contrasted with paper for a value of $2,020,108 exported in the same month of the year before.

Exports of paper of all kinds from the United States for the first ten months of 1923 totaled in value $21,564,871, against exports valued at $19,869,557 in the corresponding time of 1922.

Exports of news print in October last amounted to 2,246,965 pounds, valued at $109,884, compared with 2,260,546 pounds for a value of $108,674 exported in October, 1922, thus showing that while the quantity declined slightly the value in October last was greater. Exports of news print for the first ten months of last year totaled 26,310,702 pounds, valued at $1,330,691, contrasted with exports of 44,972,477 pounds for a value of $2,015,495 in the same period of 1922.

IMPORTS

Wood Pulp

It can be said that the market for foreign wood pulp is in a waiting condition in the United States. There has been a lack of important trade activity during the past several weeks. Paper manufacturers have been occupied compiling inventories, effecting repairs to their mill equipment and in settling up their business for the end of the year, and not much attention has been given to pulp or other raw materials excepting in cases where the need has been urgent. At the same time some consumers, apparently feeling that pulp prices were at bottom levels for a while, have entered the market in an occasional way and placed orders for fairly large lots of the different kinds of foreign pulp for forward shipment from abroad, so that the market has not been entirely devoid of business activity.

Everything would seem to indicate that prices of foreign pulp are resting on the lowest level likely to be experienced in some time. While business has been far from brisk recently prices have shown a distinctly steadier tone, and there has been less selling pressure exerted on the market. Apparently most of the accumulated stocks of imported pulps in this country have been taken out of weak hands, and those having pulp to sell appear satisfied to hold off for a while in expectation of a broader demand and a rise in prices. Moreover, conditions at primary centers serve to support the steadier situation in the United States. The Baltic has frozen over for the winter, thus diminishing shipments from Sweden to the American market, while in Norway, Finland and other European countries wood pulp is displaying considerable price strength and producers are said to have less than normal amounts to dispose of.

Imports of wood pulp into the United States held up to a fairly high level during October, according to the latest Government figures, which cover that month. Importations of chemical pulp in October totaled 81,520 tons of all grades, compared with 76,739 tons in September, 89,603 tons in August and 73,564 tons in July. Imports of mechanical pulp in October were 23,469 tons, contrasted with 22,802 tons in the preceding month, 22,460 tons in August and 15,514 tons in July. October imports of chemical pulp brought the total for the first ten months of 1923 up to 843,775 tons, giving a monthly average of 84,377 tons, against a monthly average of 74,968 tons in the same period of 1922. October imports of ground wood brought the total for the year to the end of that month to 219,391 tons, giving a monthly average of 21,939 tons, against an average of 15,765 tons in the corresponding time of 1922.

Quoted prices of foreign pulps are somewhat irregular, depending on the source from which they emanate, the quality of the fibre involved, its position, and the quantity being negotiated for. Bleached sulphite of No. 1 grade is quoted at about 4 cents a pound ex dock New York, yet sales at a little under this figure have been recorded, while bleached of half prime quality has sold at 3.50 cents ex dock. Unbleached sulphite is selling at about 2.60 cents a pound ex dock New York in a majority of cases, though extra strong pulp is bringing substantially above this price. Scandinavian kraft pulp is quoted from 2.50 cents a pound upward, with most importers asking around 2.65 cents. Foreign ground wood is quoted at $37 to $38 a ton on the dock at New York or other American Atlantic ports.

Receipts at the port of New York in December and current market quotations ex dock New York follow:

Bleached sulphite, No. 1	$ 3.85- 4.25
Unbleached sulphite, No. 1	2.60- 2.85
Easy bleaching	3.00- 3.25
Mitscherlich unbleached	2.90- 3.00
Kraft	2.50- 2.75
Ground wood, per ton	37.00-38.00

Johaneson, Wales & Sparre, 2,800 bls. from Gothenburg and 500 bls. from Copenhagen; M. Gottesman & Co., 1,350 bls. from Antwerp and 720 bls. from Hamburg; H. Hollesen, 6,525 bls. from Bremen; E. Naumberg & Co., 2,268 bls. from Bremen; Perkin-Goodwin Co., 550 bls. from Christiania; Bulkley, Dunton & Co., 5,500 bls. from Christiania, 375 bls. from Stockholm, 100 bls. from Bremen and 2,500 bls. from Drammen; Pagel, Horton & Co., 120 bls. from Stockholm, 3,085 bls. from Gavles, 3,900 bls. from Husum and 1,800 bls. from Hornfors; American Woodpulp Corp., 675 bls. from Bremen, 1,000 bls. from Hamburg and 625 bls. from Bremen; Castle & Overton, 685 bls. from Bremen; Lagerloef Trading Co., 2,032 bls. from Bremen and 1,584 bls. from Helsingfors; Wilkinson Bros. & Co., 353 bls. from Hamburg; A. J. Bracher & Co., 444 bls. from Hamburg; Scandinavian Pulp Agency, 127 bls. from Gothenburg; Kidder Peabody Acceptance Corp., 5,000 bls. from Christiania and 10,000 bls. from Larvik; Nilsen, Lyon & Co., 600 bls. from Gothenburg and 450 bls. from Christiania; Parsons & Whittemore, 600 bls. from Gothenburg; Mechanics & Metals National Bank, 2,500 bls. from Gothenburg; National City Bank, 2,447 bls. from Gothenburg and 2,500 bls. from Christiania; Bank of New York & Trust Co., 488 bls. from Bremen; E. M. Sergeant & Co., 356 bls. from Gothenburg and 120 bls. from Christiania; R. F. Hammond, 5,800 bls. from Gothenburg and 1,000 bls. from Christiania; United States Lines, 698 bls. from Bremen; Globe Shipping Co., 60 bls. from Hamburg; E. J. Keller Co., 669 bls. from Gothenburg; J. Andersen & Co., 900 bls. from Christiania; Tidewater Paper Mills Co., 17,697 bls. from Gaspe, 12,308 bls. from Liverpool, N. S., and 11,200 bls. from Botwood; Order, 300 bls, from Hudiksvall and 1,260 bls. from Bremen.

Paper Stock

Importations of papermaking materials other than wood pulp during December were about normal, judging from the arrivals through the port of New York. There were some large shipments of rags, and receipts of old rope were moderate in volume. Imports of all kinds of paper stock at the port of New York in December, with names of consignees, follow:

Old Rope

Brown Bros. & Co., 192 bls. and 101 coils from Antwerp, 73 bls. and 93 coils from Hamburg, 150 coils from Copenhagen, 681 coils and 73 bls. from London, 483 coils from Bristol, 186 coils from Hull, 342 coils from Newcastle and 28 bls. from Glasgow; M. Wolfer & Co., 29 bls. from Havana; N. E. Berzen, 12 bls. from Havana; E. J. Keller Co., 222 bls. from St. Nazaire, 135 bls. from Algiers, 205 coils from Newcastle, 61 bls. from Trieste, 53 bls. from Havre, 83 coils from Antwerp and 198 coils from Rotterdam; International Purchasing Co., 51 bls. from Havre; W. Schall & Co., 196 coils from Leith, 85 coils from Antwerp and 205 bls. from Barcelona;

E. J. KELLER COMPANY
INCORPORATED
200 FIFTH AVENUE
NEW YORK

FOREIGN AND DOMESTIC
PAPER MAKERS' SUPPLIES
CHEMICAL AND MECHANICAL PULPS
COTTON, JUTE AND FLAX WASTES
EAST INDIA MERCHANDISE

Quality Guaranteed

The Smallwood-Low Stone Co.
Lisbon, Ohio
U. S. A.

BATHURST LUMBER COMPANY, LIMITED

PRICE & PIERCE, LTD.
17 East 42nd Street, NEW YORK CITY

ARE NOW THE

SOLE SELLING AGENTS
for Bathurst Pulp

Unbleached Sulphite 50 tons daily
Kraft Pulp 50 tons daily

Our pulp is made from Canadian Spruce
We ship in sheets, baled

BATHURST, NEW BRUNSWICK, CANADA

"MICHIGAN" Combination Steel and Wood Pipe

LONG DISTANCE CONVEYOR OF WATER AND PAPER STOCK IN PAPER AND PULP MILLS—Specially Adapted to Carry Sulphite, Ground Wood and "White Water"

Eighteen reasons why you should use "Michigan" combination steel and wood pipe

1—Durability of Wood Shell. 2—Sanitary. 3—20% more capacity than Cast Iron Pipe. 4—Simplicity in handling. 5—Light in weight. 6—Speed in laying. 7—Protects against freezing. 8—Not affected by Electrolysis. 9—Rigid inspection of materials. 10—Efficient construction of stave. 11—Strength of steel banding. 12—Protection of banding with asphalt coating. 13—Cannot burst under pressure. 14—Can be laid in a wet trench. 15—Short curves without specials. 16—Low installation and maintenance cost. 17—Responsibility of company. 18—Not affected by sulphur or chemical solutions.

THE MICHIGAN PIPE COMPANY
Dept. 17
BAY CITY, MICHIGAN

New York City, N. Y.....17 East 42nd St.
Oklahoma City, Okla.....105 West 16th St.
Chicago, Ill.....Leiter Bldg., 15 East Van Buren St.
Boston, Mass.....Room 737, Oliver Bldg.
Cleveland, Ohio.....919 Ulmer Bldg.
Chattanooga, Tenn.....702 James Bldg.
Philadelphia, Pa.....318 Widener Bldg.
Pittsburgh, Pa.....323 Fulton Bldg.

"Steel for Strength—Wood for Durability"

Katzenstein & Keene, 88 bls. from Rotterdam; Ellerman-Wilson Steamship Line, 55 bls. from Liverpool and 21 coils from London; International Acceptance Bank, 66 coils from Glasgow; H. S. Head, 112 coils from Glasgow and 105 bls. from Hamburg; Irving Bank-Columbia Trust Co., 66 bls. from Havre; Bank of New York & Trust Co., 115 bls. from Barcelona and 117 bls. from Copenhagen; M. Chapman, 40 bls. from Port Antonio; Order, 36 coils from Rotterdam, 144 coils from London, 13 coils from Hamburg, 41 coils and 69 bls. from Antwerp and 35 bls. from Barcelona.

Old Bagging

E. J. Keller Co., 65 bls. from Algiers, 176 bls. from Antwerp and 60 bls. from Rotterdam; Daniel M. Hicks, Inc., 64 bls. from Antwerp; E. Butterworth & Co., 304 bls. from Hull; Irving Bank-Columbia Trust Co., 26 bls. from Bristol; Maurice O'Meara Co., 48 bls. from Rotterdam; Kidder Peabody Acceptance Corp., 249 bls. from Havre; Mechanics & Metals National Bank, 75 bls. from Manchester; Equitable Trust Co., 200 bls. from Liverpool.

Rags

Katzenstein & Keen, 62 bls. from Barcelona and 118 bls. from Rotterdam; E. J. Keller Co., 220 bls. from Rotterdam, 67 bls. from Copenhagen, 60 bls. from St. Nazaire, 145 bls. from Havre, 23 bls. from Hamburg and 355 bls. from Algiers; Albion Trading Co., 15 bls. from Liverpool and 24 bls. from London; P. Berlowitz, 189 bls. from St. Nazaire and 111 bls. from Rotterdam; Stone Bros. & Victor Galaup Co., 54 bls. from St. Nazaire and 186 bls. from Havre; E. Butterworth & Co., 38 bls. from Venice; J. T. Lodge, 17 bls. from Havre; M. Wolfer & Co., 46 bls. from Havana; E. Jonofsky, 11 bls. from Havana; American Woodpulp Corp., 134 bls. from Rotterdam; S. Birkenstein & Son, 75 bls. from Bremen; Waste Material Trading Corp., 24 bls. from Rotterdam; E. W. Dutton, Inc., 10 bls. from Rotterdam and 38 bls. from Manchester; Maurice O'Meara Co., 79 bls. from Dunkirk; W. D. Lane & Co., 4 bls. from Liverpool; Coal & Iron National Bank, 157 bls. from Hamburg; Guaranty Trust Co., 130 bls. from Hamburg; Mechanics & Metals National Bank, 53 bls. from Hamburg, 225 bls. from London and 42 bls. from Bordeaux; New York Trust Co., 91 bls. from Hamburg and 463 bls. from Leghorn; Paterson National Bank, 271 bls. from London; Bank of New York & Trust Co., 41 bls. from Barcelona; Strupp & Co., 283 bls. from Hamburg; Kelly & Co., 188 bls. from London; G. P. Lotterhand, 8 bls. from Liverpool; J. J. Patricof, 187 bls. from Rotterdam; Daniel M. Hicks, Inc., 38 bls. from Rotterdam; C. C. Lavine Co., 361 bls. from Rotterdam; Goldman, Sachs & Co., 255 bls. from Hamburg, 82 bls. from St. Nazaire, 314 bls. from Rotterdam and 60 bls. from Bremen; Kidder Peabody Acceptance Corp., 35 bls. from Bremen; Irving Bank Columbia Trust Co., 45 bls. from Marseilles, 208 bls. from Constantinople and 47 bls. from Manchester; International Acceptance Bank, 6 bls. from Hamburg, 275 bls. from Bristol and 112 bls. from Manchester; Equitable Trust Co., 2,290 bls. from Havre and 37 bls. from Manchester; Order, 527 bls. from Bremen, 951 bls. from Bristol, 323 bls. from Leghorn, 831 bls. from Smyrna, 85 bls. from Liverpool, 81 bls. from Antwerp, 477 bls. from London and 6 bls. from Manchester.

Miscellaneous Paper Stock

Crane & Co., 29 bls. from Dundee; Chase National Bank, 68 bls. from Dundee; Guaranty Trust Co., 15 bls. from Antwerp and 94 bls. from Genoa; Daniel M. Hicks, Inc., 48 bls. from Liverpool and 102 bls. from Dunkirk; Kelly & Co., 120 bls. from London; International Acceptance Bank, 46 bls. from Glasgow; Maurice O'Meara Co., 192 bls. from Glasgow, 209 bls. from Antwerp and 24 bls. from Dundee; Mechanics & Metals National Bank, 46 bls. from Glasgow; Equitable Trust Co., 38 bls. from Dundee and 123 bls. from Antwerp; Grimes & Friedman, 796 bls. from Vancouver; Irving Bank-Columbia Trust Co., 15 bls. from Havre and 755 bls. from Antwerp; Coal & Iron National Bank, 32 bls. from Antwerp; E. J. Keller Co., 456 bls. from Antwerp and 108 bls. from Hamburg; W. Schall & Co., 63 bls. from Antwerp; American Exchange National Bank, 68 bls. from Antwerp; New York Trust Co., 192 bls. from Antwerp and 34 bls. from Hamburg; Goldman, Sachs & Co., 136 bls. from Antwerp; Order, 138 bls. from Antwerp, 40 bls. from London, 59 bls. from Glasgow, 12 bls. from Liverpool, 233 bls. from Hamburg and 35 bls. from Dundee.

Paper

Large receipts of wrapping from Scandinavian and German sources was the feature of importations of paper into the United States during December, judging from arrivals at the

HANS LAGERLOEF, President and Treasurer
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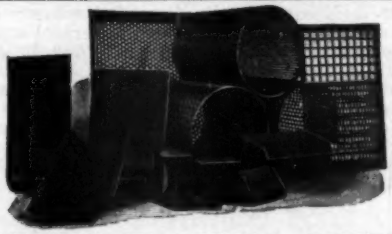

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SOUTHWARK HYDRAULIC EQUIPMENT for PULP and PAPER MILLS

The Southwark Pulp Presses and Trucks illustrated at the right are typical of many efficient installations of Southwark Equipment in actual service in paper mills throughout the United States and Canada. In addition to standard dehydrating presses for pulp, sulphite, etc., we specialize in the design and construction of machinery to suit the manufacturers' requirements.

We carry a complete line of Hydraulic Accumulators, Pumps, Valves, Fittings, Shock Absorbers, etc.

SOUTHWARK FOUNDRY & MACHINE CO.

PHILADELPHIA, PA.

CHICAGO FISHER BUILDING CLEVELAND SWETLAND BUILDING

Three 600 Ton Southwark Pulp Presses and Trucks at the Timiskaming Pulp and Paper Company, Haileybury, Ontario, Canada.

port of New York. Probably a new record of wrapping paper imports was established last month; certainly unusually heavy quantities came into the country. There were also fair-sized shipments of news print, hanging, cigarette, drawing and other kinds of paper received. Imports of paper of all kinds through the port of New York in December follow:

Cigarette

American Tobacco Co., 2,000 cs. from Bordeaux; R. J. Reynolds Tobacco Co., 950 cs. from St. Nazaire and 630 cs. from Bordeaux; P. J. Schweitzer, 52 cs. from Hamburg; Surbrug Co., 15 cs. from Havre; Gubout Freres, 12 cs. from Havre; DeManduit Paper Corp., 119 cs. from St. Nazaire, 2 cs. from Marseilles and 240 cs. from Bordeaux; Zorro Tobacco Co., 12 cs. from Lisbon; Standard Products Corp., 80 cs. from Havre and 18 cs. from Southampton; Equitable Trust Co., 4 cs. from Trieste Order, 5 cs. from Bordeaux, 12 cs. from Malta and 24 cs. from Trieste.

Printing

M. Gottesman & Co., 172 rolls from Christiania; Newsprint Paper Corp., 199 rolls from Gothenburg; Irving Bank-Columbia Trust Co., 95 bls. from Hamburg, 231 rolls from Christiania and 311 bls. from Malta; C. H. Young Publishing Co., 383 rolls from Hamburg; S. H. Scott Corp., 94 rolls from Hamburg; W. Hartman & Co., 451 rolls from Hamburg; Chemical National Bank, 792 rolls from Hamburg and 1,816 rolls from Copenhagen; Canfield Paper Co., 30 cs. from Rotterdam; B. F. Drakenfeld & Co., 89 cs. from Liverpool; United States Lines, 573 rolls from Bremen; P. C. Zuhlke, 17 bls. from Hamburg and 312 cs. from Antwerp; Parsons & Whittemore, 2,019 rolls from Bremen; Maurice O'Meara Co., 165 bls. from Hamburg; Oxford University Press, 5 cs. from Liverpool; Perry, Ryer & Co., 73 cs. from Glasgow; J. P. Heffernan Paper Co., 23 bls. from Trieste; P. Puttmann, 12 cs. from Antwerp Guaranty Trust Co., 6 rolls from Hamburg; J. E. Linde Paper Co., 108 bls. from Hamburg; Publicity Paper Corp., 269 rolls from Hamburg and 74 rolls from Trieste; American Shipping Co., 45 cs. from Hamburg; Fourth & First National Bank of Tennessee, 98 rolls from Hamburg; Seaman Paper Co., 41 rolls from Hamburg; American Exchange National Bank, 146 rolls from Christiania; Safran & Co., 15 cs. from Antwerp; National City Bank, 111 rolls from Gothenburg; Allan & Cory Paper Co., 84 bls. from Rotterdam; C. K. MacAlpine & Co., 29 bls. from Rotterdam; Melby, Kuttroff & Co., 208 rolls from Trieste; Order, 157 rolls from Genoa, 751 rolls from Hamburg, 19 bls. from Antwerp, 48 rolls from Christiania and 268 rolls from Copenhagen.

Wrapping

D. S. Walton & Co., 553 rolls and 30 bls. from Gothenburg and 117 rolls and 5 bls. from Swedish ports; C. K. MacAlpine & Co., 97 bls. from Gothenburg; American Express Co., 25 bls. from Gothenburg; Melby, Kuttroff & Co., 1,923 rolls and 51 bls. from Gothenburg and 979 rolls from Swedish ports; Chatham & Phenix National Bank, 317 rolls from Gothenburg; H. S. Chalfant, 62 rolls from Gothenburg; Corn Exchange Bank, 2,112 bls. from Gothenburg and 311 rolls from Hamburg; Republic Bag & Paper Co., 8,082 rolls and 367 bls. from Rotterdam and 288 rolls from Hamburg; W. Schall & Co., 2,373 rolls from Hamburg; Chase National Bank, 222 rolls and 11 bls. from Hamburg; Wilkinson Bros. & Co., 800 bls. and 24 rolls from Hamburg, 195 rolls and 134 bls. from Bremen and 141 bls. from Antwerp; Arkell Safety Bag Co., 1 roll from Hamburg; C. Steiner, 224 bls. from Rotterdam; Hanover National Bank, 1,239 bls. and 716 rolls from Hamburg; Gallagher & Ascher, 35 bls. from Hamburg; Schenkers, Inc., 198 bls. from Hamburg; Publicity Paper Corp., 225 bls. from Hamburg; J. P. Heffernan Paper Co., 118 bls. and 313 rolls from Hamburg and 506 bls. from Gothenburg; W. Hartmann & Co., 1,505 rolls and 670 bls. from Hamburg; Chemical National Bank, 20 bls. from Hamburg; Hallgarten & Co., 574 bls. and 1,108 rolls from Hamburg; C. G. Keferstein, 573 rolls from Bremen; T. D. Downing & Co., 66 rolls from Rotterdam; M. Greenbaum, 29 bls. from Rotterdam; Standard Underground Cable Co., 102 rolls from Glasgow; New York Trust Co., 239 bls. from Malta; W. Van Doorn, 14 cs. from Rotterdam; Great Eastern Paper Co., 266 bls. from Christiania; National City Bank, 53 bls. from Swedish ports and 1,000 bls. from Hamburg; Fernstrom Paper Co., 1,244 rolls from Swedish ports; Blauvelt-Wiley Paper Mfg. Co., 98 rolls from Swedish ports and 24 bls. from Glasgow; Safran & Co., 58 cs. from Hamburg and 13 cs. from Rotterdam; Seaman Paper Co., 51 rolls and 40 bls. from Hamburg; J. W. Hampton Jr. & Co., 64 cs. from Bremen; Steffen, Jones & Co., 13 bls. from Hamburg; Irving Bank-Columbia Trust Co., 594 rolls and 125 bls. from Hamburg and 9 rolls from Rotterdam;

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Cut down *excessive* wrapping paper investment. Why carry two wrapping paper lines for one wrapping paper *purpose?*

MOSINEE

presents a perfect wrapping paper, weight and strength for each wrapping purpose. Made in all weights from 15 pounds to 100 pounds basis. The one complete, standardized and economical line of wrapping paper sold.

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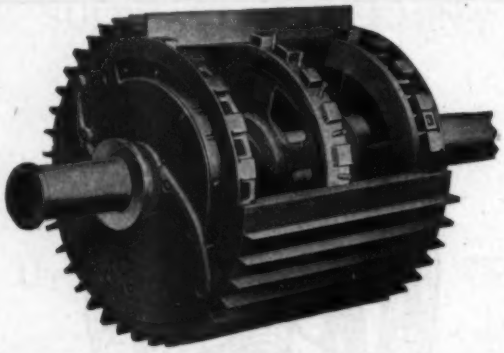

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Our Wedge Type Bandless Roll made of semi-steel with special alloy bars is practically indestructible.

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MANUFACTURERS OF
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With Flexible Blades, Universal Adjustment and Control
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other Paper Mill Specialties
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Have no superior for
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The CLAFLINS now in use have demonstrated the fact that they will do better BEATING, BRUSHING and REFINING, using ¼ the floor space, ½ the power and ⅓ the COST of any other type of beater in use today.
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THE HERMANN MANUFACTURING CO.
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One Tissue Machine, 80 inch, with Marshall drive.

One Jones Standard Jordan.

One Ryther & Pringle Shredder.

One Nash dryer exhaust unit.

One super calender, 52 inch Holyoke, with cotton rolls.

Ten Marshall drives. Rice Barton and Fales self-contained type with 6-inch mortise gears.

Fan pumps: 4-inch and 6-inch Pusey & Jones centrifugal pumps; 6-inch and 8-inch Worthington Volute pumps.

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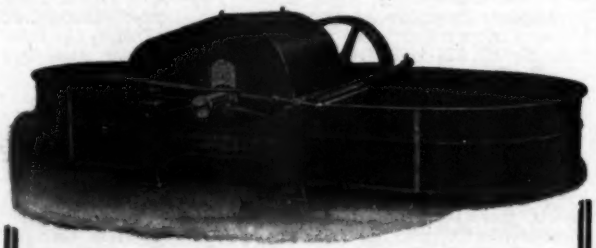

"Dayton"
Beating Engines
are Built
for
Heavy Duty

Dayton Beater and Hoist Co.
DAYTON, OHIO

Bernard, Judae & Co., 2 bls. from Hamburg and 5 cs. from Gothenburg; Birn & Wachenheim, 254 bls. from Rotterdam; Allan & Co., 115 bls. from Rotterdam; International Acceptance Bank, 371 bls. from Gothenburg; Order, 456 rolls and 97 bls. from Gothenburg, 714 bls. and 3,602 rolls from Hamburg, 106 bls. from Malta, 144 bls. from Trieste, 53 rolls from London and 898 bls. from Rotterdam.

Writing

Keuffel & Esser Co., 9 cs. from Rotterdam; Louis DeJonge & Co., 36 cs. from Marseilles; J. W. Hampton Jr. & Co., 19 cs. from Hamburg; American Shipping Co., 3 cs. from Hamburg; O. G. Hempstead & Sons, 7 cs. from Hamburg; Order, 46 cs. from Hamburg and 4 cs. from London.

Drawing

E. Dietzgen & Co., 54 cs. from Hamburg and 35 cs. from Rotterdam; Keuffel & Esser Co., 6 cs. from Liverpool and 73 cs. and 44 bls. from Hamburg; Favor, Ruhl & Co., 5 cs. from London Devoe & Raynolds Co., 5 cs. from London; A. Giese & Son, 12 cs. from Bordeaux.

Filter

J. Manheimer, 66 bls. from Antwerp; H. Reeve Angel & Co., 19 cs. from London.

Tissue

Meadows, Wye & Co., 11 cs. from Liverpool; J. C. Robold & Co., 10 bls. from Liverpool; F. C. Strype, 12 cs. from Liverpool.

Photo

Gevaert Co. of America, 175 cs. from Antwerp; J. J. Gavin & Co., 4 cs. from Liverpool; Globe Shipping Co., 35 cs. from Bremen Eastman Kodak Co., 59 rolls from Hamburg; Altek Photo Corp., 37 cs. from Rotterdam; Order, 15 cs. from Antwerp.

Hanging

F. G. Prager & Co., 1,826 rolls from Hamburg; F. G. Emmerich & Co., 6 bls. from Hamburg, 28 bls. from Southampton and 78 bls. from Liverpool; Globe Shipping Co., 4 bls. from Hamburg; W. H. S. Lloyd & Co., 138 bls. from London; Japan Paper Co., 6 cs. from Havre; National City Bank, 546 rolls from Hamburg and 1,162 rolls from Bremen; A. C. Dodman Jr. & Co., 17 cs. from Antwerp, 29 bls. from Southampton and 43 bls. from Liverpool; C. G. Keferstein, 397 rolls from Hamburg; Draeger Shipping Co., 764 rolls from Hamburg; Hallgarten & Co., 993 rolls from Hamburg; American Express Co., 4 cs. from Havre; R. F. Downing & Co., 47 bls. from London; Order, 2 cs. from Havre and 3 cs. from Antwerp.

Board

Metropolitan Import & Mfg. Co., 101 cs. from Hamburg; Bendix Paper Co., 17 cs. from Hamburg; Houbigant, Inc., 3 cs. from Southampton and 29 cs. from Havre; Friedman & Co., 9 cs. from Hamburg; Globe Shipping Co., 22 cs. from Hamburg; Dupont Cellophane Co., 19 cs. from Havre; Harriett Hubbard Ayer, 6 cs. from Havre; Coty, Inc., 154 cs. from Havre; A. Vuyk, 158 rolls from Rotterdam; American Express Co., 7 cs. from Havre; Buschmann Bros., 51 rolls from Hamburg and 75 bls. from Bremen; Flexideal Co., 100 cs. from Bremen; R. Reiner, 18 cs. from Bremen; Alpers & Mott, 38 cs. from Bremen; F. G. Prager & Co., 6 cs. from Hamburg; Pulp and Paper Trading Co., 306 rolls from Rotterdam; Electron Products Co., 25 rolls from Rotterdam; Monitor Paper Co., 172 rolls from Rotterdam; Order, 33 cs. from Hamburg.

Miscellaneous

F. B. Vandegrift & Co., 2 bls. from Gothenburg; Quality Art Novelty Co., 77 cs. from Hamburg; C. W. Williams & Co., 57 cs. from Antwerp; Whiting-Patterson Co., 5 cs. from Southampton and 8 cs. from Havre; D. Heydemann & Co., 36 cs. from Rotterdam; P. H. Petry & Co., 9 cs. from Hamburg and 4 cs. from Genoa; Globe Shipping Co., 18 cs. from Rotterdam; J. Halpern & Co., 33 cs. from Rotterdam; H. Brockelbank, 10 cs. from London; Independent Forwarding Co., 3 cs. from Havre; Heemsoth, Basse & Co., 22 cs. from Hamburg; Rice & Fielding, 8 cs. from Hamburg; L. Schlman & Co., 7 cs. from Hamburg; Borden & Riley Paper Co., 5 cs. from Antwerp; H. Reeve Angel & Co., 8 cs. from Gothenburg; C. B. Richard & Co., 10 cs. from Hamburg; H. D. Catty & Co., 2 cs. from Havre and 2 cs. from Hamburg; D. Heydeman & Co., 40 cs. from Bremen; A. Frankan & Co., 16 cs.

The Gold Brick Won't Stand Fire

There is a definite standard of fire brick value; it is not the cost per thousand brick because:

1st. All fire brick at a given cost have not the same production value. One will produce more than another: therefore

2nd. The actual standard is what a brick will do for each dollar—how many tons' production per lining, or how many months between replacements per dollar of first cost.

We are prepared to show you the results of exhaustive tests in actual service

Buy Elk value in fire brick

ELK FIRE BRICK CO.

St. Marys, Pa. Philadelphia, Pa.
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IN CANADA:
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Mine drives are notoriously hard on Belts and belt joining. They demand all that a belt fastener can give. Because Crescent Belt Fasteners insure a permanent joining for all open drives is why they are the first recommendation of belting manufacturers.

CRESCENT
Make Good Belts Give Better Service
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Standardize on Crescent Belt Fasteners to eliminate belt joint trouble and save power, money, time and labor. Send for "The Dollars and Sense of Better Belting Service."

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381 FOURTH AVE.
NEW YORK CITY

Write your name and address on the margin of this ad and send to us. (5)

A. D. COOK, Inc.

Lawrenceburg **Indiana**

FIG. NO. 50

Manufacturers of Deep Well Pumps, Working Barrels, Rods, Foot Valves, Strainers and a full line of Water Well Supplies.

The accompanying half tone shows the COOK Patent Brass Tube Well Strainer with Standard Fittings, which are Bail Plug in the bottom and Foot of Blank and Lead Packer on top.

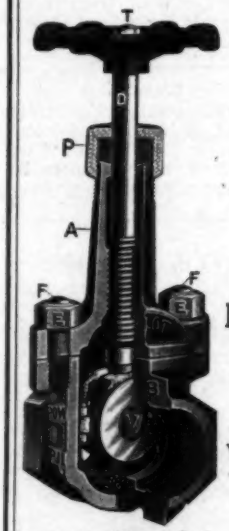
When the COOK Strainer is properly selected for the water bearing sand, capacity and method of pumping, it will successfully deliver the maximum yield of the well for many years free from sand and the troubles incident thereto.

Write for Bulletin 30A

Iron Body or All Iron

"Pilot" Gate Valves

WITH OUTSIDE SCREW STEM AND YOKE



Screwed or Flanged Ends
Working Pressure
Up to 125 Pounds

Especially Adapted for Handling

ACIDS, ALKALIS & CORROSIVE SOLUTIONS.

Order

POWELL VALVES

from your dealer

Write for Descriptive Circular

THE WM. POWELL CO.
CINCINNATI, OHIO

PRATT & CADY VALVES

Fig. 100
Bronze Renewable Ring Gate Valve

IT IS easy to renew the wearing parts of Pratt & Cady retaining ring gate valves without removing the valve from the line. Once installed it stays there! Large and comprehensive stocks at all times assure you prompt service.

Reading Steel Casting Co., Inc.

Pratt & Cady Division
General Sales Office: Bridgeport, Conn.
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An Associate Company of the American Chain Co., Inc

Made for maximum service not merely the average

TRADE JENKINS MARK

Jenkins Bros

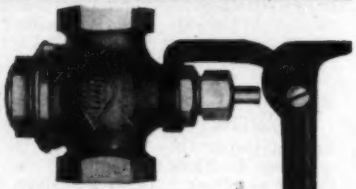

Fig. 720, Jenkins Bronze Rapid Action Valve.

Rapid Action

A great saving of time in extra motions, economy in the use of water, and greater plant efficiency, are the outstanding features in the use of a Jenkins Rapid Action Valve.

It gives rapid on-and-off action—a pull of the lever opens or closes the valve. It stays open or closed automatically. Closes without water hammer.

Made with bronze body, malleable iron lever, and fitted with Jenkins Renewable Disc.

Write us now for catalog of complete information.

JENKINS BROS.

80 White St.....New York
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646 Washington Blvd.....Chicago

Always marked with the "Diamond."

Jenkins Valves

SINCE 1864

from Bremen; C. H. Boulin, 29 cs. from Havre; Dupont Cellophane Co., 43 cs. from Southampton and 20 cs. from Antwerp; Martin & Bechtold, 16 cs. from Bremen; G. W. Sheldon & Co., 5 cs. from London; P. D. Winter, 6 bls. from Liverpool; Hoole Service Co., 23 cs. from Southampton; H. Behr & Co., 21 cs. from Genoa; Japan Paper Co., 13 cs. from Havre and 40 cs. from Genoa; Gribout Freres, 9 cs. from Havre; National City Bank, 5 cs. from Hamburg.

Foreign Trade Opportunities

Additional information regarding the following foreign trade opportunities issued by the Bureau of Foreign and Domestic Commerce of the United States Department of Commerce may be obtained from the Bureau in Washington, D. C., or its branch offices. It is requested that the number of the inquiry be given at all times.

No. 8360—Paper. Calcutta, India. Purchase and agency desired.

No. 8348—Paper, stationery, etc. Mexico City, Mexico. Agency desired.

No. 8363—Telegraph ticker tape, 30,000 rolls. Tsingtau, China. Purchase desired.

No. 8361—Waste paper. Bombay, India. Purchase desired.

No. 8457—Boxes of corrugated paper. Simcoe, Canada. Purchase desired.

No. 8396—Paper. Buenos Aires, Argentine. Agency desired.

No. 8393—Paper of all kinds. Merida, Mexico. Agency desired.

No. 8406—Wall paper. Hamilton, New Zealand. Agency desired.

No. 8556—Kraft paper of good quality. Cork, Ireland. Purchase desired.

No. 8524—Wood fiber board of all kinds. Nantes, France. Purchase desired.

No. 8637—Fiber board, vulcanized. Sydney, Australia. Agency desired.

No. 8611—Paper and sundries, stationery. Amritsar, India. Purchase and agency desired.

New Western Branches for Chain Belt

The Chain Belt Company, Milwaukee, Wis., manufacturers of Rex chain, transmission machinery and conveying equipment, formerly represented on the Pacific Coast by Meese & Goodfried Company, San Francisco, has established direct factory branches and warehouses in Portland and Seattle. Arrangements have also been made with the Washington Machinery Depot, Tacoma, Wash., to carry a large stock of Rex chain and transmission machinery. Other stocks will be placed in important centers throughout the Pacific Northwest for the prompt handling of local requirements.

The Portland office of the Chain Belt Company is located at 67-69 First St., Portland, Ore., and the Seattle office at 1040 Sixth Ave., S., Seattle, Wash. Large stocks are maintained at both places.

Weller Mfg. Co. Opens New Sales Offices

The Weller Manufacturing Company of Chicago have opened new sales offices in Baltimore, Md., Salt Lake City, Utah, and Omaha, Neb.

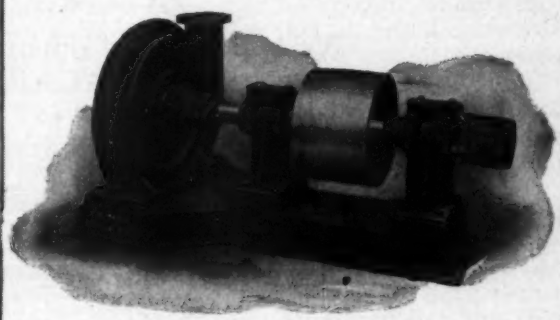
Mr. F. A. Klopp, a graduate engineer, will be in charge of their office in Baltimore, located at 1401 Lexington Bldg. Of their Omaha territory, Mr. O. F. Barklage, of the Industrial Sales & Engineering Company, will be in charge, with offices at 627 Grain Exchange Bldg., while the Utah territory will be handled by the Stratton-Cahoon Company, at 809 McIntyre Bldg., Salt Lake City.

C. G. Bates of the Fremont Forest Experiment Station has found that the very small and minute particles in the soil may have an important effect upon the rate of growth of forest trees. For example, a very large proportion of alkali may be held in an absorbed condition by the clay and may not become soluble even when there is abundant water. Since the clay is as important in soil as the soil water itself, this absorbed alkali has a far-reaching effect upon the tree's rate of growth.

Castle & Overton, importers of and dealers in paper mill supplies of 200 Fifth avenue, New York, have incorporated, the charter of incorporation being issued on December 29 by the Secretary of State of New York. The new corporation has 4,000 shares of preferred stock of $100 par value, and 1,000 shares of common stock of no par value. William A. Castle, Frank C. Overton and Carlton B. Overton were the incorporators.

CENTRIFUGAL PUMPS

for



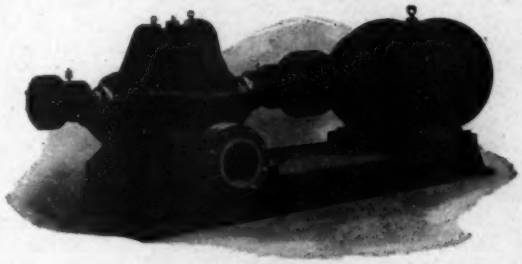
Water, Acid and Stock

Manufactured By

E. M. Cross Mach. Co.

BERLIN, N. H.

Aurora Centrifugal Pumps



Type OMD

Aurora pumps are made in many types, to meet all conditions found in the paper mill field.

We specialize in horizontally and vertically split open and inclosed impeller, single and multi-stage and deep well turbine centrifugal pumps as well as deep well reciprocating pumps.

A card from you stating your conditions places our engineers at your service and results in a saving to you.

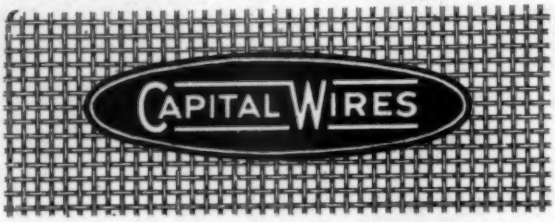
AURORA PUMP & MFG. CO.

Home Office and Factories, Aurora, Ill., U. S. A.

SERVICE QUALITY DELIVERY

"Happy New Year"

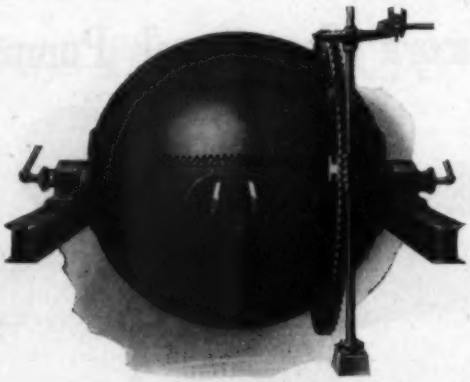
We hope for the opportunity of making you Happy during 1924 with "CAPITAL" Service and Quality.



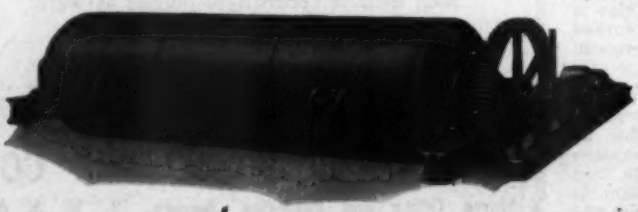
Fourdrinier Wires and Paper and Pulp Mill Wire Cloth in BRASS and PHOSPHOR BRONZE.

We carry large stocks of CYLINDER COVERS in all meshes and can make prompt shipment.

Capital Wire Cloth & Mfg. Co., Ltd., Ottawa, Canada



Globe and Cylinder Rotary Bleaching Boilers
Digesters
Riveted Steel Tanks
Flumes, Smokestacks, Penstocks, General Steel Plate Construction of every description.



Rolling Steadily for 30 Years

A LETTER recently received from a Biggs Rotary user, shows what you can expect to say 30 years hence if you also install Biggs Rotaries.

This letter, a voluntary expression of appreciation from Mr. W. W. Galloway, General Manager and Treasurer of The Hagar Straw & Board Paper Co., says:

"I thought you might be interested to know that thirty years ago tomorrow, Thanksgiving Day, the first sheet of paper went over the machines from this mill, and that the original rotary boilers that were installed by Mr. Ed. Hagar, who built the new mill at Cedarville, Ohio, are still in service. We use them constantly and find them efficient, and thought perhaps that the fact that they are still here and giving us results would be interesting to you, and we are very pleased to send you the information.

"Our Thirtieth birthday is reached with a good deal of pride and satisfaction in our many years of production and a reputation for quality products at all times. Your part in this has been no small one and we are very glad to pay tribute to the work of the material purchased from you so long ago."

Send for Biggs Booklet describing Biggs Rotaries for cooking and bleaching.

THE BIGGS BOILER WORKS CO.
Seneca Place and Case Ave., Akron, Ohio